DEIF

-power in control

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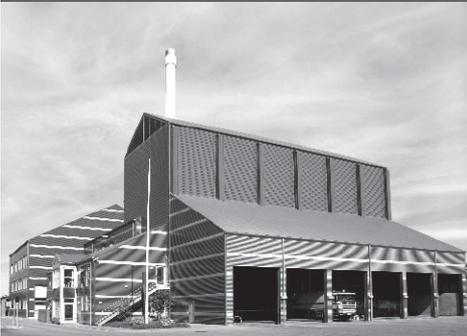**MULTI-LINE 2
APPLICATION NOTES**

M-Logic
Internal Logic Controller

- Description of M-Logic
- Functional description
- List of possible selections for logics

1. Delimitation

2. General information

3. General description

4. Configuration

5. List of events and commands

1. Delimitation

1.1 Scope of Application Notes, M-Logic

1.1.1 AGC, AGC 100, AGC 200, APU, GC-1F, CGC 400, GPC/GPU Hydro, GPU/PPU, GPU-3 REC, PPM

This document covers the following products:

AGC-3	SW version 3.62.x
AGC-4	SW version 4.59.x or later
AGC 100	SW version 4.xx.x
AGC 200	SW version 4.59.x or later
APU 200	SW version 3.53.x
GC-1F	SW version 1.2x.x and 2.23.x
CGC 400	SW version 1.00.x
GPC/GPU Hydro	SW version 3.06.x or later
GPU/PPU	SW version 3.06.x or later
GPU-3 REC	SW version 3.0x.x
PPM	SW version 3.06.x
Utility software	USW version 3.31.0

2. General information

2.1 Warnings, legal information and safety

2.1.1 Warnings and notes

Throughout this document, a number of warnings and notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text.

Warnings

⚠️ **Warnings indicate a potentially dangerous situation, which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.**

Notes

ⓘ **Notes provide general information, which will be helpful for the reader to bear in mind.**

2.1.2 Legal information and disclaimer

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the engine/generator controlled by the Multi-line 2 unit, the company responsible for the installation or the operation of the set must be contacted.

⚠️ **The Multi-line 2 unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.**

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is a discrepancy, the English version prevails.

2.1.3 Safety issues

Installing and operating the Multi-line 2 unit may imply work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

⚠️ **Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.**

2.1.4 Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

2.1.5 Factory settings

The Multi-line 2 unit is delivered from factory with certain factory settings. These are based on average values and are not necessarily the correct settings for matching the engine/generator set in question. Precautions must be taken to check the settings before running the engine/generator set.

2.2 About the Application Notes

2.2.1 General purpose

This document includes application notes for DEIF's Multi-line 2 unit. It mainly includes examples of different applications suitable for the unit.

(i) **For functional descriptions, the procedure for parameter setup, parameter lists, and so on, see the Designer's Reference Handbook.**

The general purpose of the application notes is to offer the designer information about suitable applications for the Multi-line 2 unit.

⚠ **Make sure to read this document before starting to work with the Multi-line 2 unit and the gen-set to be controlled. Failure to do this could result in human injury or damage to the equipment.**

2.2.2 Intended users

The Application Notes are mainly intended for the person responsible for designing Multi-line 2 systems. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in this document.

2.2.3 Contents and overall structure

This document is divided into chapters, and in order to make the structure simple and easy to use, each chapter will begin from the top of a new page.

3. General description

3.1 Introduction

3.1.1 Introduction to M-Logic

The M-Logic is a small logic controller incorporated in the Multi-line 2 unit. Even though it is a logic controller, it must not be confused with a PLC. The M-Logic can be compared with a PLC limited in functionality and can only be used for uncomplicated tasks.

The M-Logic can carry out binary control functions only; there are no possibilities for analogue reading and/or control functions.

The M-Logic can be programmed from the free PC tool called DEIF Utility Software (USW version 3). The USW can be downloaded from: www.deif.com/download_centre/software_download.aspx.

M-Logic setting is done in command lines. There are 40 lines, and each line contains 3 events, 2 operators and one output with a possibility to make a time delay.

If 3 operators are not enough, a number of virtual events can be used to pass the control on to another line and carry on there. This makes it possible to build larger eventbased controls.

4. Configuration

4.1 Starting

4.1.1 Starting the M-Logic
Once the USW has been started, there will be an icon on the lower left-hand side to activate M-Logic
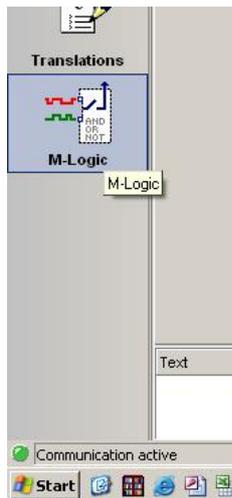
Click the icon, and the following screen appears:
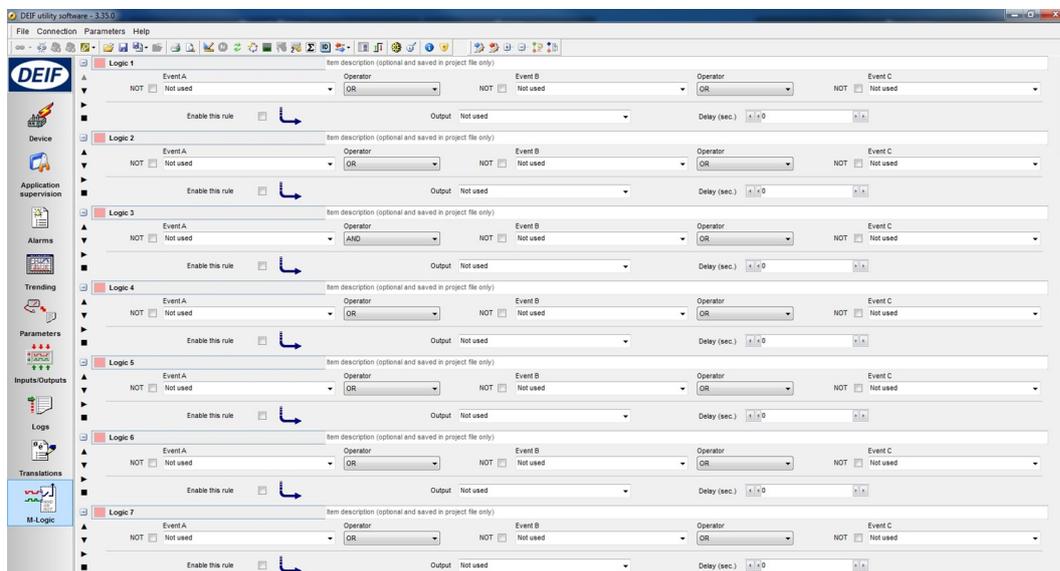
4.2 Read/write

When the M-Logic screen is shown, the M-Logic toolbar appears at the top of the screen. The toolbar has two buttons which are used to write and read the M-Logic configuration to and from the unit.

The M-Logic configuration can also be saved/opened to/from a file using the default save/open buttons.

Read M-Logic settings from the unit
Activating this button will read all M-Logic settings from the unit to the USW.

Write M-Logic settings to the unit
Activating this button will write the M-Logic settings from the USW to the unit.

4.3 Save/open

Save
Activating this button makes it possible to save the M-Logic configuration to file (part of the general Multi-line 2 configuration file ".USW").

Open
Activating this button makes it possible to open a previously saved logics file.

4.4 Basic functions

4.4.1 Basic functions
The M-Logic consists of a number of "lines", Logic 1, Logic 2 and so on. Each of these lines have three **event** settings, two **operator** settings, one **enable** tick box and one **output** setting.

The Logic line can be collapsed or expanded using this button. The free text will still be shown.

ⓘ **The free text is stored in the .usw file, but not in the product itself.**

The available functions are:

4.4.2 Events A, B and C
These are used to trigger the logic.

Note that for each event, the function "NOT" can be selected to get an inverted function.

When opening the roll-down window of the events, this window appears:
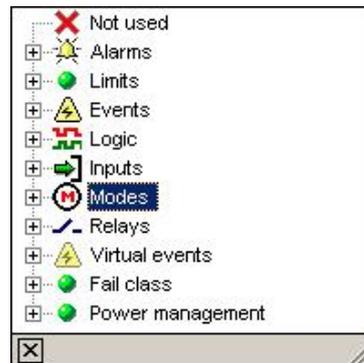
Alarms: Use an alarm to activate.

Limits: Same as alarms, only with no time delay on binary inputs.

Events: Events that are not alarms, e.g. "Engine running".

Static sync. type: Selected static sync. functionality.

Cmd timers: (AGC-3/ AGC-4/ AGC 100/ AGC 200/ GC-1F/CGC 400 only)   If the activating (triggering) event is required to be a pulse, these can be used (1 sec. pulse).

CAN inputs: (AGC-3/ AGC-4/ AGC 100/ AGC 200/ GC-1F/CGC 400 only)   Status of M-Logic functions broadcasted on the power management CAN line.

Logic: Can be TRUE or FALSE. TRUE means always, FALSE means never.

Inputs: Direct activation of a binary input. The availability of binary inputs is option-dependent.

Modes: Running modes and plant modes, e.g. "AUTO".

Relays: Activation when a relay activates. The availability of relay outputs is option-dependent.

Virtual events: A number of internal (virtual) events that can be activated from another logic line. By using these virtual events, the number of activating (triggering) events can be expanded from the three available in each logic line to, in theory, an unlimited number of events.

Fail class: The event activates upon activation of any alarm with the chosen fail class, e.g. "Shutdown".

CANshare: (PPU-3/GPC-3 only)   CANshare sections and BTB feedbacks.

EIC events: (Not APU 200/ GC-1F v.1/ GPU-3 REC/ PPM)	Events that are related to engine communication. (The event is option H5/H7-dependent).
Power manage- ment:	Status related to power management, e.g. "All GB on".
Heavy consum- ers: (AGC-3/ AGC-4/AGC 200 only)	Status related to heavy consumers, e.g. "HC01 request ID01" or "HC02 ack. ID05".

(i) **The contents of the roll-down window vary slightly between the different Multi-line products.**

4.4.3 Operators
Two operators are available, and they can be:
"OR" (any operator activates the function output),
"AND" (all activated operators must have status ON to activate the function output).

4.4.4 Enable the rule
If this tick box is not ticked, the logic in question will not operate.

4.4.5 Output

This is the selection of the reaction of the system upon activation of the function. Note that the output has a delay function. If set to 0 s (default), there is no delay.

Commands:	Command to the Multi-line unit, e.g. select AUTO running mode.
Virtual events:	A number of internal (virtual) events that can be activated and used in another logic line. By using these virtual events, the number of activating (triggering) events can be expanded from the three available in each logic line to, in theory, an unlimited number of events. Virtual events can also be trigged from Modbus.
Relays:	Selection of a relay output. The selection of these is option-dependent.
Inhibits:	A selection of inhibit functions for the alarms.
Static sync. type:	Selection between static sync. functionalities.

Gov/AVR control:	Possibility to force the speed/voltage control up or down for 5 sec.
Alarm LED: (GC-1F/AGC 100/AGC 200/CGC 400 only)	The availability of the alarm LEDs is dependent on the module in question. GC-1F/AGC 200: 4 LEDs mounted on the display front.
EIC commands: (AGC-3/AGC-4/AGC 100/AGC 200/GC-1F v.2/ GPC-3/GPU-3/GPU-3 Hydro/PPU-3/CGC 400 only)	Commands that are related to engine communication. (The commands are option H5/H7-dependent).
Buzzer: (AGC 100/GC-1F/GPC-3/ GPU-3/GPU-3 Hydro/ PPU-3/CGC 400 only)	Incorporated buzzer or buzzer in the additional operator panel. Control of activation and deactivation of the buzzer (e.g. with alarms).
CAN cmd: (AGC-3/AGC-4/AGC 100/AGC 200/PPM-3 only)	Command to the Multi-line unit connected to the power management CAN line, e.g. select AUTO running mode in all Multi-line units.
CANshare: (PPU-3/GPC-3 only)	Activation of load share sections.

> **(i)** **If a relay output is chosen, the relay in question must be set up to be a limit relay output. This is done in the parameter list under "OUTPUTS".**
> **GC-1F: If a relay output is chosen, the relay in question must be set up to be an alarm/limit output (input/output settings, icon in the top of the USW).**

4.4.6 LED colour priority
In case an LED has more than one output for selection of colour, then the presented colour will be selected from this priority:

Priority	Colour
1	Red flashing
2	Red
3	Yellow flashing
4	Yellow
5	Green flashing
6	Green

4.5 Definitions

The TRUE and FALSE states are explained below.

A TRUE state of an input/event will be detected, if the condition defined in the input/event is met.

Examples given:
Digital input is TRUE when activated (12/24V DC applied)

Alarm condition is TRUE when the alarm is present
Mode condition is TRUE when the mode is selected

A FALSE state of an input event will be detected, if the condition defined in the input event is **not** met.

Examples given:
Digital input is FALSE when deactivated (12/24V DC not applied)
Alarm condition is FALSE when the alarm is not present
Mode condition is FALSE when the mode is not selected

4.6 Examples

By using the events, rules can be made for the use of the M-Logic.

4.6.1 Virtual events
Virtual events are used to expand the number of events in a logic sequence.

The following shows how the output of Logic 1 is used to continue the sequence in Logic 2.
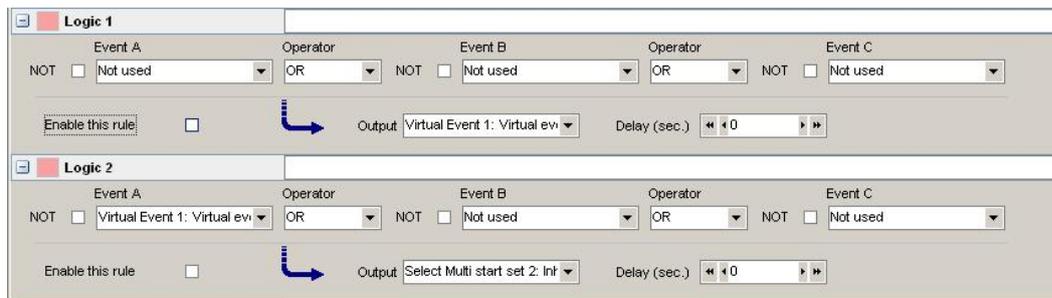
The Logic 1 output is set to Virtual Event 1.
The Event A in Logic 2 is Virtual Event 1.

This gives a total of five events that can be used in this logic sequence (A + B + C in Logic 1 and B + C in Logic 2).

4.6.2 Set/reset function
If you use a single binary input for e.g. selection of AUTO/MANUAL, you need a SET/RESET function, since two binary inputs are normally required for this.

In the following example, binary input no. 10 is used to switch between AUTO (input ON) and MANUAL (input OFF).

First line: If input 10 = ON and AUTO = OFF (NOT Auto operation mode), then set AUTO mode command.

Second line: If input 10 = OFF and MANUAL = OFF (NOT Manual operation), then set MANUAL mode command.

In M-Logic, it looks like this:
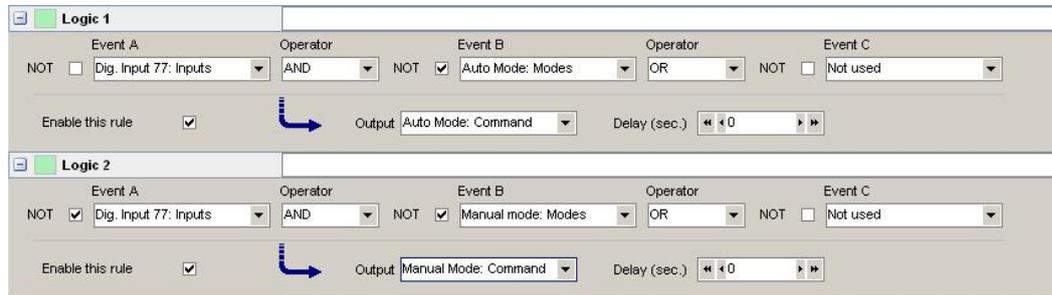
4.6.3 Toggle function

Using a single button to toggle between two running modes.

In this example, the button no. 1 on the AOP-2 (configured in a separate tool) is used to activate Virtual event 1. Logic 1 selects AMF if the mode is NOT AMF, and Logic 2 selects LTO mode if the mode is NOT LTO. In this way, one single button can be used for toggling between AMF and LTO modes.

AOP-2 configurator

The window below appears.

Read the present setting by clicking here:
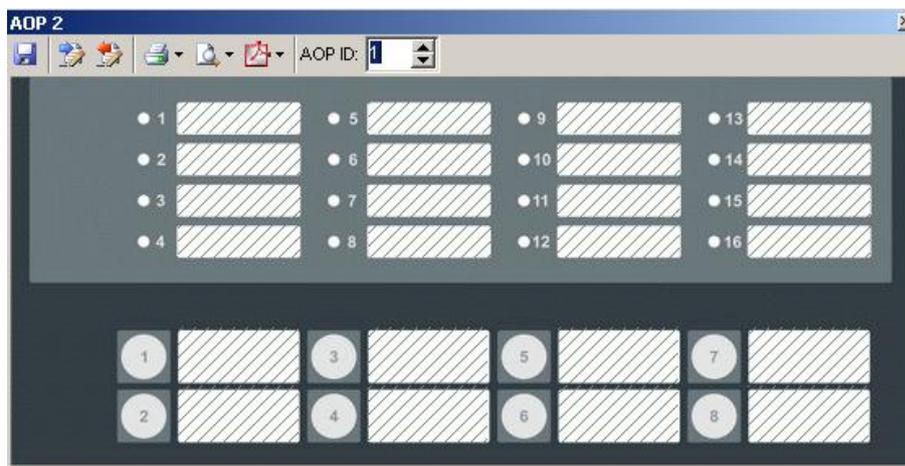
Click button 1 and you select this:
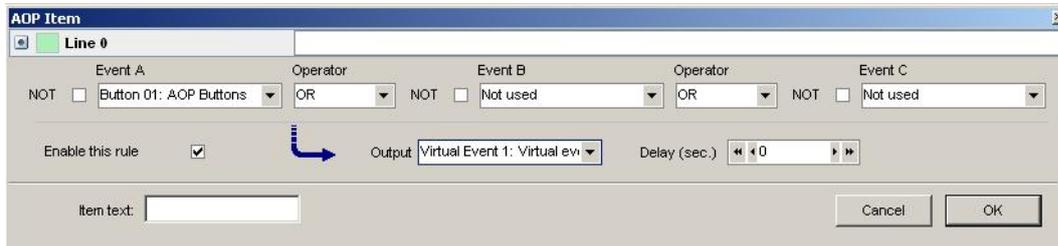
The item text can be written freely and printed, so it can be put in the AOP-2 front pockets.

Click OK. Remember to save the AOP-2 setting, and close the AOP-2 window.

Select M-Logic (bottom left-hand side).
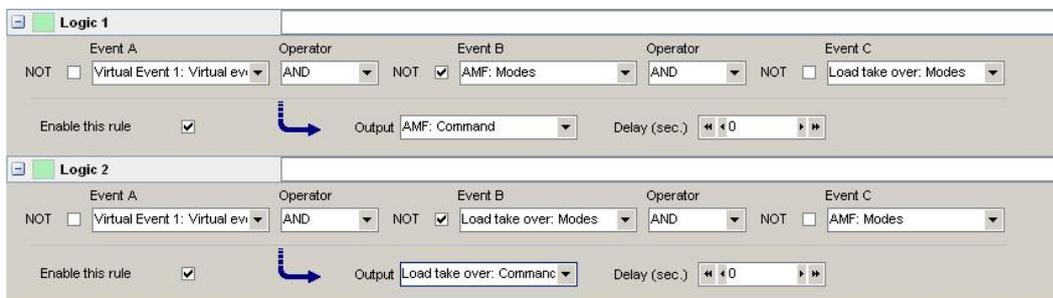
4.6.4 Controlling a relay output with one single AOP button

In this example, the relay can be replaced by any other output, and the AOP button can be replaced by e.g. a binary input.

The button of the AOP-2 must be set to activate Virtual Event 1 (VE 1) (in this case).

In Logic 1, the VE 1 will activate the relay output (26). At the same time, the relay output (26) will remain ON, unless Virtual Event 2 (VE 2) is activated (AND NOT VE 2).

In Logic 2, the VE 1 will activate VE 2 if the relay output (26) is ON (AND Relay output (26)).

The result is that the relay changes position every time the AOP button is activated.
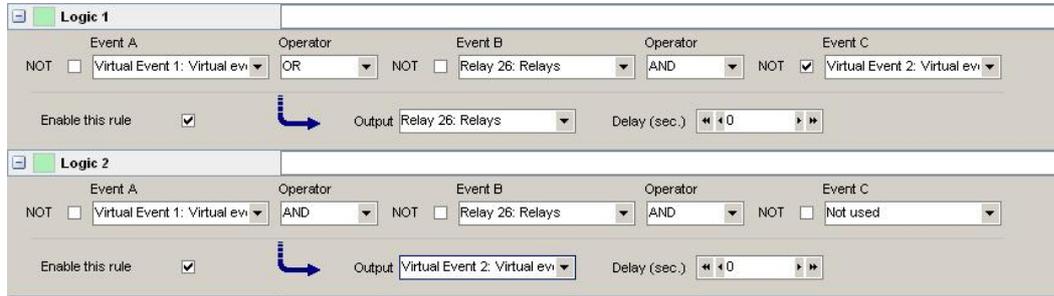
4.6.5 Power up in a specific mode
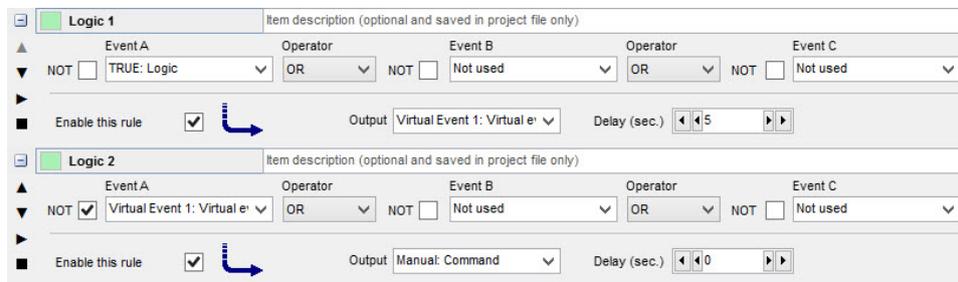
In the above example, the unit will always power up in manual mode. The timer in Logic 1 sets the output for 5 s, and this is used to set manual mode in event 2. When the timer expires, you can freely select any mode since the virtual event 1 turns ON and the Logic 2 says NOT virtual event 1.

4.6.6 Flip-flop function

If a flip-flop (periodical relay output ON/OFF) function is required, the following examples can be used:

Flip-flop by virtual event
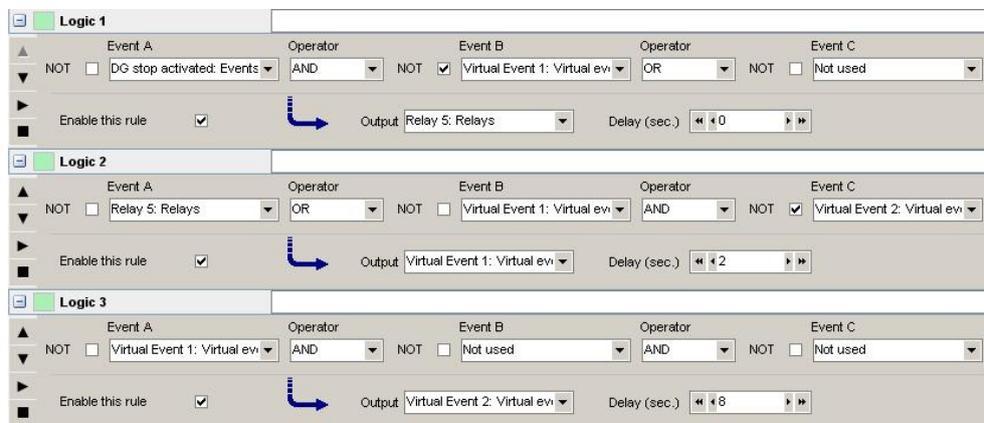
The example shows how to configure relay 5 as an output for a flashing light (or similar) during engine stopping sequence.

The event "DG Stop activated" triggers the function.

Logic 1: DG stop activated event triggers the function. The relay output resets if the virtual event (VE) 1 is active.

Logic-2: Relay 5 triggers VE 1, or VE 1 holds itself ON provided VE 2 is NOT active. The time delay of VE 1 is the relay 5 ON time.

Logic 3: VE 1 triggers VE 2. The time delay of VE 2 is the relay 5 OFF time. This time must be longer than the time delay of VE 1.

The relay 5 (parameter) must be set to "Limit".

Flip-flop by function

The example shows how flip-flop set 1 could be configured to set relay 8.

Logic 1: Flip-flop output 1 is selected to set the relay output.

Logic 2: Digital input 23 is used to trigger flip-flop set 1 and thus sets the relay output active.

Logic 3: Digital input 24 is used to deactivate the relay output by triggering flip-flop reset 1.

Logic 4: Digital input 25 is used to toggle the flip-flop output state.

The relay 8 (parameter) must be set to "Limit".

If reset and set are active at the same time, the flip-flop will prioritise the reset command.
The set or reset function may not be active when the toggle function is used.

(i) **The flip-flop by function is only available in AGC-4 and AGC 200.**

> ℹ️ **The flip-flops are also accessible from Modbus.**

4.6.7 Latches
The following latches can be useful for controlling a regulator from M-Logic.

Set/reset circuit
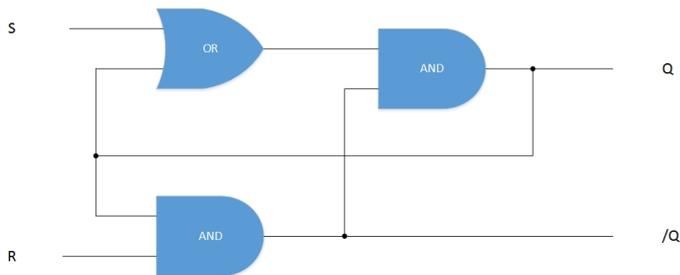
Here the set and reset signals are Virtual Event 1 and Virtual Event 2 respectively. The output, Q, is connected to an alarm LED.

Input toggle circuit

Here the set/reset signal is Virtual Event 1. The output, Q, is connected to an alarm LED.

☐	Logic 1		This line toggles the latch.						
▲		Event A		Operator		Event B	Operator		Event C
▼	NOT ☐	Virtual Event 1: Virtual ev ▾	OR ▾	NOT ☐	Virtual Event 2: Virtual ev ▾	AND ▾	NOT ☑	Virtual Event 20: Virtual e ▾
►								
■	Enable this rule	☑		Output	Virtual Event 2: Virtual ev ▾	Delay (sec.) ◄ ◄ 0 ► ►

☐	Logic 2		This line resets the latch.						
▲		Event A		Operator		Event B	Operator		Event C
▼	NOT ☐	Virtual Event 1: Virtual ev ▾	AND ▾	NOT ☐	Virtual Event 2: Virtual ev ▾	OR ▾	NOT ☐	Not used ▾
►								
■	Enable this rule	☑		Output	Virtual Event 20: Virtual e ▾	Delay (sec.) ◄ ◄ 0 ► ►

☐	Logic 3		This line is the output of the latch.						
▲		Event A		Operator		Event B	Operator		Event C
▼	NOT ☐	Virtual Event 2: Virtual ev ▾	OR ▾	NOT ☐	Not used ▾	OR ▾	NOT ☐	Not used ▾
►								
■	Enable this rule	☑		Output	LED 01 Red: Alarm ind. LE ▾	Delay (sec.) ◄ ◄ 0 ► ►

Output toggle circuit

Here the pulse generator is driving the set/reset signal. The set/reset signal is Virtual Event 1. The output, Q, is connected to an alarm LED. Remember the delay time setup for the pulse.

⊟	Logic 1		This line generates a pulse every 4 second.					
▲		Event A	Operator		Event B	Operator		Event C
▼	NOT ☑	Virtual Event 1: Virtual ev ▾	OR ▾	NOT ☐	Not used ▾	OR ▾	NOT ☐	Not used ▾
▶								
■	Enable this rule ☑		Output Virtual Event 1: Virtual ev ▾		Delay (sec.) ◂◂ 4 ▸▸			

⊟	Logic 2		The set input of the circuit is then connected to the pulse generator.					
▲		Event A	Operator		Event B	Operator		Event C
▼	NOT ☐	Virtual Event 1: Virtual ev ▾	OR ▾	NOT ☐	Virtual Event 2: Virtual ev ▾	AND ▾	NOT ☑	Virtual Event 3: Virtual ev ▾
▶								
■	Enable this rule ☑		Output Virtual Event 2: Virtual ev ▾		Delay (sec.) ◂◂ 0 ▸▸			

⊟	Logic 3		The reset input of the circuit is connected to the pulse generator aswell.					
▲		Event A	Operator		Event B	Operator		Event C
▼	NOT ☐	Virtual Event 1: Virtual ev ▾	AND ▾	NOT ☐	Virtual Event 2: Virtual ev ▾	OR ▾	NOT ☐	Not used ▾
▶								
■	Enable this rule ☑		Output Virtual Event 3: Virtual ev ▾		Delay (sec.) ◂◂ 0 ▸▸			

⊟	Logic 4		This line shows the output of the pulse generator.					
▲		Event A	Operator		Event B	Operator		Event C
▼	NOT ☐	Virtual Event 1: Virtual ev ▾	OR ▾	NOT ☐	Not used ▾	OR ▾	NOT ☐	Not used ▾
▶								
■	Enable this rule ☑		Output LED 01 Red: Alarm ind. LE ▾		Delay (sec.) ◂◂ 0 ▸▸			

⊟	Logic 5		This line is the output of the whole circuit.					
▲		Event A	Operator		Event B	Operator		Event C
▼	NOT ☐	Virtual Event 2: Virtual ev ▾	OR ▾	NOT ☐	Not used ▾	OR ▾	NOT ☐	Not used ▾
▶								
■	Enable this rule ☑		Output LED 02 Yellow: Alarm ind. ▾		Delay (sec.) ◂◂ 0 ▸▸			

5. List of events and commands

5.1 References

5.1.1 References to DRH and description of options

(i) **The terms used in the lists are those used in the Designer's Reference Handbook and the description of options. Please refer to these documents for detailed explanations.**

(i) **If there are no references to the function in question, the reference can be found in the Designer's Reference Handbook.**

5.2 AGC-3/AGC-4/AGC 100/CGC 400/AGC 200/PPM-3

5.2.1 Events, AGC-3/AGC-4/AGC 100/CGC 400/AGC 200/PPM-3

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
Alarms	X	X	X	X	X	X	All alarms are available as events in the alarm category. Note that the list will show all alarms, also those that are not available in the present configuration of basic unit and options.	-
Alarms external I/O		X					CAN1 comm. error	Alarm is active when for example Beckhoff is set up in the CAN type parameter 7981.
		X					CAN2 comm. error	
Limits	X	X	X	X	X	X	Like the alarm list it represents the alarms.	If the outputs A and B of the alarm in question (e.g. BB < 1) are set to "limit", the alarm message will not appear, but the function will still trigger in the M-Logic limits section.
Events	X	X	X	X	X	-	Mains fail	Mains failure condition (single generator set).
	X	X	X	X	X	-	MB closed	Mains breaker (single generator set).
	X	X	X	X	X	-	MB opened	
	X	X	-	-	X	-	MB synchronising	
	-	-	-	-	-	X	SGB closed	Shaft generator
	-	-	-	-	-	X	SGB opened	
	-	-	-	-	-	X	SGB synchronising	
	-	-	-	-	-	X	SCB closed	Shore connection generator
	-	-	-	-	-	X	SCB opened	
	-	-	-	-	-	X	SCB synchronising	

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	-	X	X	BTB closed	Bus tie breaker unit
	X	X	X	-	X	X	BTB opened	
	X	X	X	-	X	X	BTB synchronis-ing	
	X	X	X	X	X	X	GB opened	Generator breaker (generator set).
	X	X	X	X	X	X	GB closed	
	X	X	-	-	X	X	GB synchronis-ing	Generator breaker synchronising in pro-gress (generator set).
	X	X	-	-	X	-	Peak shaving active	Peak shaving cuts the peak of the mains con-sumption by paralle-ling the generator to the mains (single gen-erator set).
	X	X	X	X	X	X	G volt/freq OK delay expired	Diesel generator V/Hz OK (generator set).
	X	X	X	-	X	-	GB direct in	Generator breaker is being closed on a dead busbar (genera-tor set).
	X	X	X	-	X	X	GB black close request	Generator breaker di-rect close on request to dead busbar.
	X	X	X	X	X	X	Running	Engine is running (generator set).
	X	X	X	X	X	-	Access lock	Binary input access lock activated.
	X	X	X	X	X	X	Emergency stop	Emergency stop acti-vated.
	X	X	X	X	X	X	DG ready for auto start	All is normal, no alarms.
	X	X	X	X	X	X	Cranking	Crank output activa-ted.
	X	X	X	X	X	X	Start activated	Start sequence activa-ted.
	X	X	X	X	X	X	Lamp test	Lamp test in progress.
	-	X	-	-	X	-	Mains ATS ac-tive	Indicates if the mains ATS function is active. The function is only accessible in mains units.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	X	X	-	Battery test activated	Battery test in progress.
	X	X	X	X	X	X	Cool down active	Cool down sequence in progress.
	X	X	X	X	X	-	Engine heater in manual control	Force/release block of engine heater (toggle function)
	X	X	X	X	X	-	Alternative start activated	Alternative start is a full AMF sequence test of the plant. This is started on the AGC-3/AGC 200 mains.
	X	X	-	-	X	-	Event log selected for printing	For the printer option, these three printouts can be selected.
	X	X	-	-	X	-	Alarm log selected for printing	
	X	X	-	-	X	-	Battery log selected for printing	
	X	X	X	X	X	X	Parameter set 1 used	The parameter sets can be selected internally or with binary input.
	X	X	X	X	X	X	Parameter set 2 used	
	X	X	X	X	X	-	Parameter set 3 used	
	X	X	X	X	X	-	Parameter set 4 used	
	X	X	X	-	X	X	DG in quarantine	The diesel generator cannot be used.
	-	-	-	-	-	X	DG supply	Status information on BTB unit.
	-	-	-	-	-	X	SG/SC supply	
	X	X	X	X	X	EDG	Test mode simple selected	Selection of test mode.
	X	X	-	-	X	EDG	Test mode load selected	
	X	X	X	X	X	EDG	Test mode full selected	
	X	X	-	-	X	-	Multi-start 1 selected	Multi-start is the selection of number of generator sets to be started upon blackout.
	X	X	-	-	X	-	Multi-start 2 selected	

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	-	-	X	X	BA voltage OK	Busbar A voltage for BTB unit.
	X	X	X	X	X	X	BB voltage OK	Busbar voltage. (Busbar B for BTB unit)
	X	X	X	-	X	X	Application 1 activated	The applications are the choices of the plant layout. Four different layouts can be stored at the same time.
	X	X	X	-	X	X	Application 2 activated	
	X	X	X	-	X	X	Application 3 activated	
	X	X	X	-	X	X	Application 4 activated	
	X	X	X	-	X	-	Single DG selected	Application selection.
	X	-	-	-	X	-	Dual mains selected	
	X	X	X	-	X	-	Multi-mains selected	
	-	X	-	-	-	-	Genset group selected	
	-	X	-	-	-	-	Genset group plant selected	
	X	X	X	-	X	X	Dynamic section equal static section	Power management feature.
	X	X	X	X	X	X	G volt/freq OK	Generator frequency and voltage are within range.
	-	-	-	-	-	X	SG/SC volt/freq OK	Shaft generator/shore connection voltage and frequency OK
	X	X	X	-	X	-	Update mode local selected	Update of setting on local
	X	X	X	-	X	-	Update mode on all selected	Update of setting on all AGCs.
	X	X	-	-	X	-	Absolute prio. used	Fixed start priority.
	X	X	-	-	X	-	Relative prio. used	Start priority relative to running hour counters.
	X	X	X	X	X	X	Ack. all alarms active	Acknowledge all active alarms.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	-	-	X	-	MB synchronisation to DG activated	Mains breaker.
	X	X	-	-	X	-	MB synchronisation to DG deactivated	
	X	X	-	-	X	-	GB synchronisation to mains activated	Generator breaker.
	X	X	-	-	X	-	GB synchronisation to mains deactivated	
	X	X	X	X	X	-	Mode shift activated	Mode shift between a running mode and AMF (Automatic Mains Failure).
	X	X	X	X	X	-	Mode shift deactivated	
	X	X	-	-	X	X	GOV up 5 s activated	Speed governor.
	X	X	-	-	X	X	GOV down 5 s activated	
	X	X	-	-	X	X	AVR up 5 s activated	AVR (voltage control).
	X	X	-	-	X	X	AVR down 5 s activated	
	X	X	-	-	X	-	CBE activated	Activate Close Before Excitation function.
	X	X	-	-	X	-	CBE deactivated	Deactivate Close Before Excitation function.
	X	X	X	X	X	-	3-phase system	AC configuration.
	X	X	X	X	X	-	Split L1L3-phase system	
	X	X	X	X	X	-	Split L1L2-phase system	
	X	X	X	X	X	-	Single phase system	
	X	X	-	-	X	-	Inductive reference selected	Inductive or capacitive cosphi reference.
	X	X	-	-	X	-	Capacitive reference selected	
	X	X	X	-	X	-	Dynamic sync selected	Sync. method selected.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	-	X	-	Static sync selected	
	-	X	-	-	X	-	Power offset 1 activated	Power reference offset.
	-	X	-	-	X	-	Power offset 2 activated	
	-	X	-	-	X	-	Power offset 3 activated	
	-	X	-	-	X	-	Cosphi offset 1 activated	Cosphi reference offset.
	-	X	-	-	X	-	Cosphi offset 2 activated	
	-	X	-	-	X	-	Cosphi offset 3 activated	
	-	X	X	X	X	-	Test application selected with output cmd enabled	Emulation with engine and breaker relay reaction.
	-	X	X	X	X	-	Test application selected with output cmd disabled	Emulation without engine and breaker relay reactions.
	-	X	X	X	X	-	BB Parameter set 1 used	Nominal busbar settings 1 and 2.
	-	X	X	X	X	-	BB Parameter set 2 used	
	-	-	-	-	X	-	BB Unom = Gen Unom used	The nominal generator voltage is used as nominal BB voltage.
	-	X	X	X	X	-	60 Hz system	The event becomes true if the nominal frequency is higher than 55 Hz.
	-	X	-	-	X	-	Analogue offset 1 active	The analogue offsets (1, 2, 3 and 4) follow the activated nominal settings (1, 2, 3 and 4).
	-	X	-	-	X	-	Analogue offset 2 active	
	-	X	-	-	X	-	Analogue offset 3 active	
	-	X	-	-	X	-	Analogue offset 4 active	

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	Mains sync. in-hibit activated	The mains breaker sync. inhibit function is activated (this does not necessarily inhibit the synchronisation of the mains breaker).
	-	X	-	-	-	-	Mains sync. in-hibited	The mains breaker is in fact inhibited.
	-	X	X	X	X	-	Max ventilation activated	True when Max ventilation is activated.
	-	X	X	X	X	-	Max ventilation deactivated	True when Max ventilation is deactivated.
	-	-	X	-	-	-	Engine heater on	True when Engine heater is activated.
	-	-	X	-	-	-	Idle run	True when Idle run is activated.
	-	-	X	-	-	-	Fuel pump active	True when Fuel pump is active.
	-	-	-	-	-	X	SWBD mode active	The PPM unit is in switchboard control (manual).
	-	-	-	-	-	X	Alarm inhibit 1 active	Binary inputs for alarm inhibit
	-	-	-	-	-	X	Alarm inhibit 2 active	
	-	-	-	-	-	X	Alarm inhibit 3 active	
	-	-	-	-	-	X	Ramp up active	Power ramping active for diesel generator.
	-	-	-	-	-	X	Ramp down active	
	-	-	-	-	-	X	Deload active	Diesel generator being taken off busbar/grid.
	-	-	-	-	-	X	PTI mode active	Shaft generator is in "Power Take In" mode.
	-	-	-	-	-	X	STS mode active	Shore is in "Ship to Ship" mode.
	-	-	-	-	-	X	Min. nbr. run. Off	The minimum number running function is set to setting 1, 2, 3 or Off.
	-	-	-	-	-	X	Min. nbr. run. Set 1	
	-	-	-	-	-	X	Min. nbr. run. Set 2	

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	-	-	-	X	Min. nbr. run. Set 3	
	-	-	-	-	-	X	Max. nbr. run. Off	The maximum number running function is set to setting 1, 2, 3 or Off.
	-	-	-	-	-	X	Max. nbr. run. Set 1	
	-	-	-	-	-	X	Max. nbr. run. Set 2	
	-	-	-	-	-	X	Max. nbr. run. Set 3	
	-	X	-	-	X	-	Deload active	The unit is deloading.
	-	X	-	-	X	-	Power droop active	The "Frequency-dependent power droop" is active.
	-	X	-	-	X	-	Q droop active	The "Voltage-dependent Q droop" is active.
	-	X	-	-	X	-	Cos phi droop active	The "Voltage-dependent PF droop" is active.
	-	X	-	-	X	-	Direct close on dead BA and BB Active	True when the BTB can close if the busbar is black on both sides
	-	X	-	-	X	-	Direct close on dead BA or BB Active	True when the BTB can close if the busbar is black on either sides
	-	X	-	-	X	-	Idle run activated	True when idle run is activated
	-	X	-	-	X	-	Idle run deactivated	True when idle run is deactivated
	-	X	-	-	X	-	L1L2L3 phase rotation active	True when the phase rotation is: L1L2L3
	-	X	-	-	X	-	L1L3L2 phase rotation active	True when the phase rotation is: L1L3L2
	-	X	-	-	-	-	Fast start sequence from Auto start/stop via Digital input 117 READY	See the Option G4, G5 and G8 manual, chapter "Fast start of engine"
	-	X	-	-	-	-	Fast start sequence from Mains via Power management READY	See the Option G4, G5 and G8 manual, chapter "Fast start of engine"

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
Logic	X	X	X	X	X	X	Not used	-
	X	X	X	X	X	X	TRUE	"Always".
	X	X	X	X	X	X	FALSE	"Never".
Redun-dancy	-	X	-	-	X	-	PM CAN ready	Power Management CAN communication is ready. Indicates when a preferred primary unit is ready to regain primary status from the redundant unit after power up.
	-	X	-	-	X	-	Redundant controller	This indicates that the controller is in redundant status
	-	X	-	-	X	-	Redundant backup present	This indicates that a redundant controller is present
Remote Main-tenance Box	X	X	-	-	-	-	RMB state off	Configuration of Remote Maintenance Box.
	X	X	-	-	-	-	RMB state start	
	X	X	-	-	-	-	RMB state sync.	
	X	X	-	-	-	-	RMB state de-load mains	
	X	X	-	-	-	-	RMB state island	
	X	X	-	-	-	-	RMB state sync to mains	
	X	X	-	-	-	-	RMB state de-load	
	X	-	-	-	-	-	RMB state connected	
Com-mand timers	X	X	X	X	X	-	Cmd timer 01 active	The command timers will operate in pairs of two to activate and de-activate a flop-flop function.
	X	X	X	X	X	-	Cmd timer 02 active	
	X	X	X	X	X	-	Cmd timer 03 active	
	X	X	X	X	X	-	Cmd timer 04 active	
	X	X	X	X	X	-	Any Cmd timers active	

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
CAN inputs	X	X	X	X	X	-	CAN inputs 01-16 active	The CAN inputs are handled as binary inputs but are CAN telegrams in the power management CAN line.
Inputs	X	X	X	X	X	X	Binary input activated (digital input or external I/O)	The number of binary inputs selectable is hardware option-dependent. The number indicates the terminal number for the input in question.
	-	-	-	-	X	X	Stop coil wirebreak	Stop coil wirebreak alarm active.
	-	-	X	X	X	X	Emergency stop	Emergency stop input activated (note that this is normal state for it).
Modes	X	X	X	X	X	-	Island	Island is one or several generators running in an island NOT connected to mains grid.
	X	X	X	X	X	-	AMF	Automatic mains failure.
	X	X	X	-	X	-	Peak shaving	Peak shaving cuts the peak of the mains consumption by paralleling the generator to the mains.
	X	X	X	-	X	-	Fixed power	Mains grid parallel fixed generator power.
	X	X	X	-	X	-	Mains power export	Export of power to the mains grid.
	X	X	X	X	X	-	Load takeover	Load is transferred from mains to generator, and mains is disconnected.
	X	X	-	-	X	-	Power management	Power management active.
	X	X	-	-	X	-	Genset group mode	Active for AGC mains units.
	X	X	-	-	X	-	Remote maintenance	Remote transformer maintenance.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	-	-	-	X	DG supply	Diesel generator supply mode
	-	-	-	-	-	X	SC 1 supply	Shore connection no. 1 supply mode
	-	-	-	-	-	X	SC 2 supply	Shore connection no. 2 supply mode
	-	-	-	-	-	X	SG 1 supply	Shaft generator no. 1 supply mode
	-	-	-	-	-	X	SG 2 supply	Shaft generator no. 2 supply mode
	-	-	-	-	-	X	SWBD control	Indication of generator running mode.
	X	X	X	-	X	X	Semi-auto mode	
	X	X	X	X	X	X	Auto mode	
	X	X	X	X	X	EDG	Test mode	
	X	X	X	X	X	-	Manual mode	
	X	X	X	X	X	-	Block mode	
	X	X	X	-	X	-	DI semi-auto mode used	DI = Digital Input.
	X	X	X	-	X	-	DI test mode used	
	X	X	X	X	X	-	DI auto mode used	
	X	X	X	X	X	-	DI manual mode used	
	X	X	X	X	X	-	DI block mode used	
	X	X	X	X	X	-	Mode shift or AMF activated	Mode shift active or AMF sequence active.
Relays	X	X	X	X	X	X	Relay output activated	The number of relays available is option-dependent. The number relates to the lowest terminal number of the output.
Virtual events	X	X*	X	X	X*	X	Virtual event 1-32 *Extended range 1-96	These are used as interconnection between multiple logics to enhance the possible number of events in one sequence.
Fail class	X	X	X	X	X	X	Block	Start blocking.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	X	X	X	Warning	Warning.
	X	X	X	X	X	X	Trip GB	Trip genset breaker.
	X	X	X	X	X	X	Trip+stop	Trip breaker, cool down and stop.
	X	X	X	X	X	X	Shutdown	Trip genset breaker and stop engine.
	X	X	X	X	X	-	Trip MB	Trip mains breaker.
	X	X	-	-	X	X	Trip BTB	Trip bus tie breaker.
	X	X	X	-	X	EDG	Trip TB	Trip tie breaker.
	X	X	X	-	X	X	Safety stop	A failure condition is expected, and the generator will be taken out for safety reasons. This feature is only useful in power management.
	X	X	X	X	X	-	Trip MB/GB	MB will be primary breaker to trip. If no MB is available in the application, the GB will trip instead.
Power management	-	-	-	-	-	X	All GBs closed	All genset breakers closed in a section.
	X	X	X	-	X	X	All GBs opened	All genset breakers opened in a section.
	X	X	X	-	X	X	Any GB closed	Minimum 1 genset breaker closed in a section.
	X	X	X	-	X	-	Any MB closed	Minimum 1 mains breaker closed in a section.
	-	-	-	-	-	X	Any SCB/SGB closed	-
	X	X	X	-	X	X	Unit has command status	This unit is in command.
In the following section, the X in the "Description" column refers to the "Int. comm. ID" (channel 7531).								
	X	X	X	-	X	X	DG X GB closed	Diesel generator breaker closed.
	X	X	X	-	X	-	Mains X TB closed	Tie breaker controlled by mains unit closed.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	-	X	X	DG X GB opened	Diesel generator breaker closed.
	X	X	X	-	X	X	DG X volt/freq OK	Diesel generator volt-age and frequency OK.
	X	X	X	-	X	-	Mains X TB opened	Tie breaker controlled by mains units open.
	X	X	X	-	X	-	Mains X mains volt/freq OK	Mains grid voltage and frequency OK.
	-	-	-	-	-	X	SG/SC X volt/freq OK	Shore/shaft connec-tion voltage and fre-quency OK
	X	X	X	-	X	X	DG X ready to auto start	Diesel generator ready to auto start.
	X	X	X	-	X	-	Mains X in auto or test	Mains unit in auto or test running mode.
	-	-	-	-	-	X	DG X has any alarm present	Diesel generator unit has an alarm.
	X	-	X	-	-	-	Mains X has any alarm present	Mains unit has an alarm.
	-	X	-	-	X	-	PM ID X has any alarm present	Diesel generator or any mains unit has an alarm
	-	-	-	-	-	X	SG/SC X has any alarm present	Shore/shaft connec-tion unit has an alarm
	X	X	X	-	X	X	DG X running	Diesel engine running.
	X	X	X	-	X	-	Mains X MB closed	Mains breaker closed.
	X	X	X	-	X	-	Mains X MB opened	Mains breaker open.
	-	-	-	-	-	X	SG/SC X run-ning	Shaft/shore generator running
	-	-	-	-	-	X	SGB/SCB X closed	Shaft/shore generator breaker closed
	-	-	-	-	-	X	SGB/SCB X opened	Shaft/shore generator breaker open
	X	X	X	-	X	X	DG X synchro-nising	Diesel generator breaker is being synchronised.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	-	X	-	Mains X synchronising	Mains breaker is being synchronised.
	X	X	X	-	X	-	Mains X TB synchronising	Tie breaker is being synchronised.
	-	-	-	-	-	X	SGB/SCB X synchronising	Shaft generator breaker is being synchronised.
	X	X	X	-	X	X	BTB X BTB closed	Bus tie breaker is closed.
	X	X	X	-	X	X	BTB X BTB opened	Bus tie breaker is open.
	X	X	X	-	X	X	BTB X BTB synchronising	Bus tie breaker is being synchronised.
	X	X	X	-	X	-	Mains X mains failure	Mains failure detected.
	-	-	-	-	-	X	DG supply sequence	System is going to diesel generator supply.
	-	-	-	-	-	X	SG/SC X supply sequence	System is going to shaft/shore generator supply.
	X	X	X	-	X	X	Any BTB deloading	Any bus tie breaker is deloading.
	-	-	-	-	-	X	DG supply	System is in diesel generator supply.
	-	-	-	-	-	X	SG 1/2 supply	System is in shaft generator supply.
	-	-	-	-	-	X	Shore 1/2 supply	System is in shore connection supply.
	-	-	-	-	-	X	DI shore connection position ON	Digital input shore connection on.
	-	-	-	-	-	X	First priority	Indicates number of priority.
	X	X	X	-	X	X	First standby	Indicates number of priority.
	X	X	X	-	X	X	Second standby	Indicates number of priority.
	X	X	X	-	X	X	Third standby	Indicates number of priority.
	X	X	-	-	X	X	Secured mode active	Run with required number of DGs + one extra.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	-	-	X	X	Base load active	This genset is allowed to activate the base load function.
	X	X	-	-	X	X	Base load inhibited	This genset is not allowed to activate the base load function.
	X	X	-	-	X	X	Base load enabled	This genset is not allowed to activate the base load function.
	X	X	-	-	X	X	LD start timer expired	Load-dependent start sequence is initiated.
	X	X	-	-	X	X	LD stop timer expired	Load-dependent stop sequence is initiated.
	X	X	X	-	X	-	Any mains on busbar	Do any of the mains connections supply voltage to the busbar?
	X	X	X	-	X	-	Any MB synchronising	Are any of the mains breakers in the process of synchronising?
	X	X	X	-	X	-	Any TB synchronising	Are any of the tie breakers in the process of synchronising?
	X	X	X	-	X	-	Any TB deloading	Are any of the tie breakers in the process of being deloaded?
	X	X	X	-	X	-	Asymmetric LS enabled	Asymmetric LS enabled
	X	X	X	-	X	-	Asymmetric LS active	Asymmetric LS active
	-	-	-	-	-	X	EDG volt/freq OK	-
	-	-	-	-	-	X	EDG has any alarm present	-
	-	-	-	-	-	X	EDG running	-
	-	-	-	-	-	X	EDG GB opened	-
	-	-	-	-	-	X	EDG GB closed	-
	-	-	-	-	-	X	EDG TB opened	-
	-	-	-	-	-	X	EDG TB closed	-
	-	-	-	-	-	X	EDG GB synchronising	-

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	-	-	-	X	EDG TB syn-chronising	-
	-	-	-	-	-	X	EDG in TEST mode	EDG TEST sequence initiated.
	-	-	-	-	-	X	EDG in harbour operation	-
	-	-	-	-	-	X	Any SG with PTH mode ac-tive	-
	-	-	-	-	-	X	Any SC with ship to ship sup-ply active	-
Heavy con-sumers	X	X	-	-	X	X	DG X HC 1 re-quest	HC 1 generator X re-quested.
	X	X	-	-	X	X	DG X HC 2 re-quest	HC 2 generator X re-quested.
	-	-	-	-	-	X	SG X HC 1 re-quest	HC 1 shaft generator X requested.
	-	-	-	-	-	X	SG X HC 2 re-quest	HC 2 shaft generator X requested.
	X	X	-	-	X	X	DG X HC 1 ac-knowledge	HC 1 generator X ac-knowledge.
	X	X	-	-	X	X	DG X HC 2 ac-knowledge	HC 2 generator X ac-knowledge.
	-	-	-	-	-	X	SG X HC 1 ac-knowledge	HC 1 shaft generator X acknowledge.
	-	-	-	-	-	X	SG X HC 2 ac-knowledge	HC 2 shaft generator X acknowledge.
	X	X	-	-	X	X	Any unack. HC request	Any heavy consumer requested without ac-knowledge.
	X	X	-	-	X	X	All HC req ack	All heavy consumers requested with ac-knowledge.
	X	X	-	-	X	X	Any HC request	Any heavy consumer in operation.
	X	X	-	-	X	X	Any HC ack. no feedback	Any heavy consumer acknowledged without power feedback.
EIC event	X	X	X	X	X	-	DPF Lamp OFF	Particulate filter is OK.
	X	X	X	X	X	-	DPF Lamp ON (solid)	Indicates initial need for regeneration.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	X	X	-	DPF Lamp ON (blink)	Regeneration is necessary (after regeneration the lamp turns OFF).
	X	X	X	X	X	-	DPF Active Regeneration not activated (status)	Regeneration status.
	X	X	X	X	X	-	DPF Active Regeneration activated (status)	Regeneration status.
	X	X	X	X	X	-	DPF Active Regeneration needed (status)	Regeneration status.
	X	X	X	X	X	-	DPF Regen not needed (status)	Level of needed regeneration.
	X	X	X	X	X	-	DPF Regen needed – lowest level (status)	Level of needed regeneration.
	X	X	X	X	X	-	DPF Regen needed – moderate level (status)	Level of needed regeneration.
	X	X	X	X	X	-	DPF Regen needed – highest level (status)	Level of needed regeneration.
	X	X	X	X	X	-	DPF Regen not inhibited (lamp)	Regeneration switch is disabled.
	X	X	X	X	X	-	DPF Regen inhibited (lamp)	Regeneration disable switch is active. Automatic and manual regeneration cannot occur.
	X	X	X	X	X	-	High Exh Syst Temp OFF (lamp)	Exhaust temp. below.
	X	X	X	X	X	-	High Exh Syst Temp ON (lamp)	Exhaust temp. above.
	-	X	-	-	-	-	MTU LIMIT LAMP OFF (lamp)	MTU J1939 only. LIMIT lamp OFF.
	-	X	-	-	-	-	MTU LIMIT LAMP ON (solid)	MTU J1939 only. LIMIT lamp ON.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	-	-	MTU LIMIT LAMP ON (blink)	MTU J1939 only. LIMIT lamp blinking.
	-	X	-	-	-	-	SCR Opr. Inducement Active OFF (lamp)	Aftertreatment Selective Catalytic Reduction Operator Inducement Active. LAMP OFF.
	-	X	-	-	-	-	SCR Opr. Inducement Active ON (solid)	Aftertreatment Selective Catalytic Reduction Operator Inducement Active. LAMP ON.
	-	X	-	-	-	-	SCR Opr. Inducement Active ON (blink)	Aftertreatment Selective Catalytic Reduction Operator Inducement Active. LAMP ON blinking.
		X				-	Purge Active ON (status)	Purging of DPF active after engine has been running.
PID regulator	-	-	X	-	-	-	PID1 up pulse activated	PID1 up pulse triggered. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID1 down pulse activated	PID1 down pulse triggered. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID1 auto regulation activated	Auto regulation mode is activated for PID1.
	-	-	X	-	-	-	PID1 manual regulation activated	Manual regulation mode is activated for PID1.
	-	-	X	-	-	-	PID1 off regulation activated	Off regulation mode is activated for PID1.
	-	-	X	-	-	-	PID2 up pulse activated	PID2 up pulse triggered. Only relevant when the regulator is in manual regulation mode.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	-	-	PID2 down pulse activated	PID2 down pulse triggered. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID2 auto regulation activated	Auto regulation mode is activated for PID2.
	-	-	X	-	-	-	PID2 manual regulation activated	Manual regulation mode is activated for PID2.
	-	-	X	-	-	-	PID2 off regulation activated	Off regulation mode is activated for PID2.
	-	-	X	-	-	-	PID3 up pulse activated	PID3 up pulse triggered. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID3 down pulse activated	PID3 down pulse triggered. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID3 auto regulation activated	Auto regulation mode is activated for PID3.
	-	-	X	-	-	-	PID3 manual regulation activated	Manual regulation mode is activated for PID3.
	-	-	X	-	-	-	PID3 off regulation activated	Off regulation mode is activated for PID3.
CIO alarms	-	X	-	-	X	-	CIO 116 No. 1 In. 10 to CIO 116 No. 3 In. 26	There is one alarm per input. Only visible if the CIO modules are enabled.
	-	X	-	-	X	-	CIO 308 No. 1 In. 8.1 to CIO 308 No. 3 In. 29.2	There are two alarms per input. Only visible if the CIO modules are enabled.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	CIO 308 No. 1 In. 8 wire fail to CIO 308 No. 3 In. 29 wire fail	The M-Logic event is active when the alarm is active. Wire break detection must be activated before this event can become active. Only visible if the CIO modules are enabled.
	-	X	-	-	X	-	CIO 116 No. 1 module missing to CIO 308 No. 3 module missing	Only visible if the CIO modules are enabled.
CIO limits	-	X	-	-	X	-	CIO 116 No. 1 In. 10 to CIO 116 No. 3 In. 26	Is active at the same time as the associated alarm, except that the alarm can be hidden by setting output A and output B to "Limits". In this case the alarm event will always be deactivated, but the limit event will be active when the alarm is active. Only visible if the CIO modules are enabled.
	-	X	-	-	X	-	CIO 308 No. 1 In. 8.1 to CIO 308 No. 3 In. 29.2	
	-	X	-	-	X	-	CIO 308 No. 1 In. 8 wire fail to CIO 308 No. 3 In. 29 wire fail	
CIO dig. inputs	-	X	-	-	X	-	CIO 116 no. 1. In. 10 to CIO 116 no. 3. In. 26	The event is active when the terminal is energised.
CIO dig. outputs	-	X	-	-	X	-	CIO 208 no. 1 Out. 9 to CIO 208 no. 3 Out. 27	The event is active when the relay is energised.

Event	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	CIO 116 no. 1 conf. status output to CIO 308 no. 3 conf. status output	The event is active when the relay is energised. If the status relay is not configured as configurable, the event will be deactivated at all times.
General purpose PID	-	X	-	-	X	-	PIDx active (1-4)	Indicates which PID is active.
	-	X	-	-	X	-	PIDx at min. output (1-4)	Indicates when the PID is at minimum output.
	-	X	-	-	X	-	PIDx at max. output (1-4)	Indicates when the PID is at maximum output.
	-	X	-	-	X	-	PID1 using input (1-3)	Indicates which PID input is active.
	-	X	-	-	X	-	PID2 using input (1-3)	Indicates which PID input is active.
	-	X	-	-	X	-	PID3 using input (1-3)	Indicates which PID input is active.
	-	X	-	-	X	-	PID4 using input (1-3)	Indicates which PID input is active.
	-	X	-	-	X	-	PIDx Modbus control (1-4)	Indicates if the PID is controlled by Modbus.
Flip-flops	-	x	-	-	X	-	Flip-flop outputs 1-16	The event is active when the flip-flop is set or toggled.
Easy connect	-	X	-	-	X	-	Plant active	The event is active when the controller is in a power management system.
	-	X	-	-	X	-	Stand-alone	The event is active when the controller is not in a power management system.

5.2.2 Operators

Operator	Description	Notes
OR	Using OR between 2 events means that the output will activate when one of these activates.	
AND	Using AND between 2 operators means that the output will only activate if both events are activated.	

5.2.3 Outputs, AGC-3/AGC-4/AGC 100/CGC 400/AGC 200/PPM-3

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
Com-mands	X	X	X	X	X	-	Island	Function modes.
	X	X	X	X	X	-	AMF	
	X	X	X	-	X	-	Peak shaving	
	X	X	X	-	X	-	Fixed power	
	X	X	X	-	X	-	Mains power export	
	X	X	X	X	X	-	Load takeover	
	-	X	-	-	-	-	Power management	
	X	X	-	-	-	X	Activate secured mode	
	X	X	-	-	-	X	Deactivate secured mode	
	-	-	-	-	-	X	Deactivate min. no. running	
	-	-	-	-	-	X	Activate min. no. running 1	
	-	-	-	-	-	X	Activate min. no. running 2	
	-	-	-	-	-	X	Activate min. no. running 3	
	-	-	-	-	-	X	Deactivate max. nbr. DG Run	
	-	-	-	-	-	X	Activate max. nbr. DG run set 1	
	-	-	-	-	-	X	Activate max. nbr. DG run set 2	
	-	-	-	-	-	X	Activate max. nbr. DG run set 3	
	-	-	-	-	-	X	SG/SC supply	
	-	-	-	-	-	X	SWBD control	
	X	X	X	-	X	X	Semi-auto	Running modes.
	X	X	X	X	X	X	Auto mode	

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	X	X	X	Test mode	
	X	X	X	X	X	-	Manual mode	
	X	X	X	X	X	-	Block mode	
	-	-	-	-	-	X	DG supply	
	X	X	-	-	-	X	Activate base load	
	X	X	-	-	-	X	Deactivate base load	
	X	X	X	X	X	X	Lamp test	Activate lamp test (LEDs on display).
	-	X	-	-	X	-	Warm up ramp	Activate warm up ramp
	X	X	X	X	X	X	Ack. all alarms	Acknowledge all alarms.
	X	X	X	-	X	-	Battery test	Activate battery test
	X	X	X	X	X	-	Engine heater manual ctrl.	Force/release block of engine heater (this will disable/enable the engine heater function).
	X	X	X	X	X	-	Set to local start	Select local start in a power management application.
	X	X	X	X	X	-	Set to remote start	Select remote start in a power management application.
	X	X	X	X	X	X	Set clock to 4 am	Set the device clock to 4 am/04.00.
	X	X	-	-	-	-	Switch log to print	Switch between event, alarm and battery log to print.
	X	X	-	-	-	-	Print log	Print output.
	X	X	-	-	-	-	Print status	
	X	X	X	X	X	X	Set parameter 1	Choose a parameter set (nominal settings).
	X	X	X	X	X	X	Set parameter 2	
	X	X	X	X	X	-	Set parameter 3	
	X	X	X	X	X	-	Set parameter 4	
	X	X	-	-	X	-	Derate Pnom	Activate derate.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	-	-	Derate Pnom 1	Activate derate 1
	-	X	-	-	-	-	Derate Pnom 2	Activate derate 2
	-	X	-	-	-	-	Derate Pnom 3	Activate derate 3
	X	X	X	X	X	-	Select test type to simple	Test sequence selection.
	X	X	-	-	X	-	Select test type to load	
	X	X	X	X	X	-	Select test type to full	
	X	X	X	-	X	-	Block GB sequence	Block the operation of the genset breaker.
	X	X	-	-	X	X	BTB X closed feedback	X = Address (33-40 for bus tie breakers).
	X	X	-	-	X	X	BTB X opened feedback	X = Address (33-40 for bus tie breakers).
	X	X	-	-	X	X	BTB X close cmd	X = Address (33-40 for bus tie breakers).
	X	X	-	-	X	X	BTB X open cmd	X = Address (33-40 for bus tie breakers).
	-	-	-	-	-	X	Open SGB/SCB X	Shaft generator breaker or shore connection breaker.
	-	-	-	-	-	X	Close SGB/SCB X	
	X	X	X	-	X	X	Select application 1	Power management: Four different applications can be stored at the same time in the units. Here the selection between them can be made.
	X	X	X	-	X	X	Select application 2	
	X	X	X	-	X	X	Select application 3	
	X	X	X	-	X	X	Select application 4	
	-	-	X	-	-	-	Run my ID	Runs the connected mains
	-	X	-	-	X	-	Run my ID constant	Runs the connected mains (constant)
	-	X	-	-	X	-	Run my ID active	Runs the connected mains (one shot)

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	-	-	Run one mains	Run one mains only
	-	-	X	-	-	-	Run all mains	Run all mains in application
	X	X	X	-	-	-	Update mode local	Running mode update for the single AGC-3/AGC 200s.
	X	X	X	-	X	-	Update mode on all	Running mode update for all AGC-3/AGC 200s.
	X	X	X	-	X	X	Store common settings	Broadcast the common settings to all units.
	X	X	-	-	X	-	Abs. prio. handling	Absolute (fixed) start priority.
	X	X	-	-	X	-	Rel. prio. handling	Relative (running timer based) start priority.
	X	X	X	X	X	X	Open GB	Generator breaker.
	X	X	X	X	X	X	Close GB	
	X	X	X	X	X	-	Open MB	Mains breaker.
	X	X	X	X	X	-	Close MB	
	-	-	-	-	-	X	Open SGB/SCB	Shaft generator/shore connection.
	-	-	-	-	-	X	Close SGB/SCB	
	X	X	X	X	X	X	Start and close GB	Start the engine and close the breaker/open the breaker and stop engine.
	X	X	X	X	X	X	GB open and stop	
	X	X	X	X	X	-	Auto start/stop	ON = Start, OFF = Stop.
	X	X	X	X	X	X	Remote start	Pulse signal.
	X	X	X	X	X	X	Remote stop	Pulse signal.
	-	-	-	-	-	X	EIC droop	Droop command to the engine communication controller.
	-	-	-	-	-	X	EIC droop emulated	When active, the Multi-line 2 unit will emulate the droop function.
	X	X	-	-	X	X	Activate base load	Activates the base load function.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	-	-	X	X	Deactivate base load	Disables the base load function.
	X	X	X	X	X	X	First priority	Forces this unit to have the first priority in a power management system.
	X	X	-	-	X	-	Freeze ramp	Locks the power ramp up function until the command is disabled again.
	X	X	-	-	X	-	Use Ana LS instead of CAN	Forces the power management system to use the analogue load share line.
	-	-	-	-	X	-	Use alternative LS instead of PM	If power management load sharing fails this function enables the use of CAN share as backup
	X	X	-	-	X	X	Activate Asymmetric LS	Activate asymmetric load share.
	X	X	-	-	X	X	Deactivate Asymmetric LS	Deactivate asymmetric load share.
	X	X	X	X	X	-	Select 3-phase system	Selects the AGC-3/AGC 200 to expect to measure AC voltage on a 3-phase system.
	X	X	X	X	X	-	Select split L1L3-phase system	Selects the AGC-3/AGC 200 to expect to measure AC voltage on a 2-phase system.
	X	X	X	X	X	-	Select split L1L2-phase system	Selects the AGC-3/AGC 200 to expect to measure AC voltage on a 2-phase system.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	X	X	-	Select single phase system	Selects the AGC-3/AGC 200 to expect to measure AC voltage on a 1-phase system.
	X	-	-	-	-	-	Act. view 1	These functions are used to force the display to show the measurements in view 1-4 that are available in "V1".
	X	-	-	-	-	-	Act. view 2	
	X	-	-	-	-	-	Act. view 3	
	X	-	-	-	-	-	Act. view 4	
	X	X	-	-	-	-	Remote maintenance	The genset mode remote maintenance is activated. Not present in AGC 200.
	X	X	-	-	-	-	Mbox meas relay on	Activates measurement relay if remote maintenance is active. Not present in AGC 200.
	X	X	X	X	X	-	Idle run low speed	Idle speed constant low speed.
	X	X	X	X	X	-	Idle run temp control	Idle speed temperature-dependent.
	X	X	X	X	X	-	Cool down threshold	Interrupt cool down sequence.
	X	X	-	-	X	-	Inductive reference	Inductive or capacitive cosphi reference.
	X	X	-	-	X	-	Capacitive reference	
	-	-	X	-	X	X	Activate all AOP-2 buzzers	All AOP-2 buzzers.
	-	-	X	-	X	X	Activate all AOP-2 relays	All AOP-2 relays.
	-	-	X	-	X	X	Activate relay on AOP-2 ID1	Single AOP-2 relays.
	-	-	X	-	X	X	Activate relay on AOP-2 ID2	
	-	-	X	-	X	X	Activate relay on AOP-2 ID3	
	-	-	X	-	X	X	Activate relay on AOP-2 ID4	

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	X	X	Activate relay on AOP-2 ID5	
	-	-	X	-	X	X	Activate buzzer on AOP-2 ID1	Single AOP-2 buzzer.
	-	-	X	-	X	X	Activate buzzer on AOP-2 ID2	
	-	-	X	-	X	X	Activate buzzer on AOP-2 ID3	
	-	-	X	-	X	X	Activate buzzer on AOP-2 ID4	
	-	-	X	-	X	X	Activate buzzer on AOP-2 ID5	
	X	X	-	-	X	X	Enable analogue LS	Activate analogue load sharing.
	X	X	-	-	X	-	Act. dynamic sync.	Selection between static and dynamic sync.
	X	X	-	-	X	-	Act. static sync.	
	-	X	X	-	X	-	Fan A running	Running feedback for cooling fans.
	-	X	X	-	X	-	Fan B running	
	-	X	X	-	X	-	Fan C running	
	-	X	X	-	X	-	Fan D running	
	-	X	-	-	X	-	Act. power offset 1	Power reference offset activation.
	-	X	-	-	X	-	Act. power offset 2	
	-	X	-	-	X	-	Act. power offset 3	
	-	X	-	-	X	-	Deact. power offset 1	Deactivate power reference offset.
	-	X	-	-	X	-	Deact. power offset 2	
	-	X	-	-	X	-	Deact. power offset 3	
	-	X	-	-	X	-	Act. cosphi offset 1	Cosphi reference offset activation.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	Act. cosphi offset 2	
	-	X	-	-	X	-	Act. cosphi offset 3	
	-	X	-	-	X	-	Deact. cosphi offset 1	Deactivate cosphi reference offset.
	-	X	-	-	X	-	Deact. cosphi offset 2	
	-	X	-	-	X	-	Deact. cosphi offset 3	
	-	X	X	X	-	-	MB close inhibit	Inhibit the closing of MB.
	-	X	-	-	-	-	Activate Fuel Pump	Override fuel pump hysteresis to fill the tank to threshold level.
	X	X	X	X	X	-	Reset horn	Reset the horn relay.
	-	X	X	-	X	-	Reset I max. demand	Reset the peak current detected in the unit.
	-	X	X	-	X	-	Reset I thermal demand	Reset the thermal current detected in the unit.
	-	X	X	-	X	-	Pulse counter 1	Increment pulse counters.
	-	X	X	-	X	-	Pulse counter 2	
	-	X	X	-	X	-	Reset pulse counter 1	Reset pulse counters.
	-	X	X	-	X	-	Reset pulse counter 2	
	-	-	X	X	X	-	Activate buzzer on controller/ Activate internal buzzer	Activates the controller's internal buzzer
	-	-	X	X	-	-	Deactivate buzzer on	Deactivates the controller's internal buzzer
	-	-	X	X	-	-	Reset rel. counter	
	-	X	X	X	X	-	Set BB parameter 1	Select between parameter set 1 and 2 for BB(busbar) nominal settings.
	-	X	X	X	X	-	Set BB parameter 2	

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	-	-	X	-	Set BB Unom = Gen Unom	Use the nominal generator voltage as nominal BB voltage.
	-	X	-	-	X	-	Force use of analogue offset 1	This will force a particular analogue offset to be active.
	-	X	-	-	X	-	Force use of analogue offset 2	
	-	X	-	-	X	-	Force use of analogue offset 3	
	-	X	-	-	X	-	Force use of analogue offset 4	
	-	X	-	-	X	-	Mains sync. inhibit activate	Inhibits the closing of the mains breaker.
	-	X	-	-	X	-	Mains sync. inhibit deactivate	Deactivates the close inhibit functionality on the mains breaker.
	-	X	-	-	X	-	Ack. mains protection alarms	Acknowledges all mains alarms including: 1270-1430, 1660,1700,1960,1970, 7480-7490
	-	X	X	X	X	-	M-Logic alarm 1	These are virtual alarms that can be used to trigger M-Logic events. The alarms can also be set in the digital inputs.
	-	X	X	X	X	-	M-Logic alarm 2	
	-	X	X	X	X	-	M-Logic alarm 3	
	-	X	X	X	X	-	M-Logic alarm 4	
	-	X	X	X	X	-	M-Logic alarm 5	
	-	X	-	-	X	-	Act TB deload	Activate TB deload (only in semi-auto mode)
	-	X	X	X	X	-	Act. max. ventilation	Activates max. ventilation
	-	X	X	X	X	-	Deact. max.	Deactivates max. ventilation

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	X	-	X	-	Shutdown override	Activates shutdown override
	-	X	X	-	X	-	Mains Okay	This function can be used if an input has been configured to Mains Okay. When it is set, the command Mains Okay is given. This command is sometimes called "External Mains Okay".
	-	-	X	-	-	-	External Mains Okay feature used	This function removes the need for a digital input to be configured. The M-Logic command "Mains Okay" then has to be used to signal Mains Okay.
	-	X	-	-	X	-	Access lock	Activates access lock.
	-	X	-	-	X	-	Alternative start	Activates alternative start.
	-	-	X	-	X	-	Reset service timer 1	Resets service timer 1.
	-	-	X	-	X	-	Reset service timer 2	Resets service timer 2.
	-	X	-	-	X	-	Activate ana. fan ref. set 1	Activates ana. fan ref. set 1.
	-	X	-	-	X	-	Activate ana. fan ref. set 2	Activates ana. fan ref. set 2.
	-	X	-	-	X	-	Activate ramp speed 1	Activates ramp speed 1.
	-	X	-	-	X	-	Activate ramp speed 2	Activates ramp speed 2.
	-	-	X	-	-	-	Inhibit test button	Inhibits the test button.
	-	X	-	-	X	-	Activate Idle run	Activates Idle run.
	-	X	-	-	X	-	Deactivate Idle run	Deactivates Idle run.
	-	X	-	-	X	-	Multi start all sections - this section	See the Option G4, G5 and G8 manual

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	TB power capacity - direct close	See the Option G4, G5 and G8 manual
	-	X	-	-	X	-	Direct close on dead BA and dead BB	See the Option G4, G5 and G8 manual
	-	X	-	-	X	-	Direct close breaker on dead BA or dead BB	See the Option G4, G5 and G8 manual
	-	X	-	-	X	-	Breaker configuration: Normal Close	See the Option G4, G5 and G8 manual
	-	X	-	-	X	-	Breaker configuration: Normal Open	See the Option G4, G5 and G8 manual
	-	X	-	-	-	-	Fast start sequence from Auto start/ stop via Digital input 117	See the Option G4, G5 and G8 manual (only in DG)
	-	X	-	-	-	-	Fast start sequence from Mains via Power management	See the Option G4, G5 and G8 manual (only in DG)
	-	X	-	-	X	-	Select L1L2L3 phase rotation	Activates L1L2 L3 as phase rotation direction
	-	X	-	-	X	-	Select L1L3L2 phase rotation	Activates L1L3L2 as phase rotation direction
Redundancy	-	X	-	-	X	-	Redundant controller	Forces the controller into listen only mode on the PM CAN line. Furthermore, commands for breaker and engine are suppressed. See T1 manual.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	Redundant backup present	This states that a re-dundant controller is present and ready to take over control for this unit in case of malfunction. This is necessary for the su-pervision showing in the USW. See T1 manual.
Virtual events	X	X*	X	X	X*	X	Virtual event 1-32 *Extended range 1-96	These are used as in-terconnection between multiple logics to en-hance the possible number of events in one sequence.
Relays	X	X	X	X	X	X	Selectable no. of relays is op-tion-depend-ent	The list will show all relays possible, includ-ing optional ones. Make sure that a se-lected relay is actually present.
Inhibits	X	X	X	X	X	-	Not used	-
	X	X	-	-	X	X	Activate LD stop used	Load-dependent stop.
	X	X	-	-	X	X	Activate LD stop	
	X	X	X	X	X	-	Deactivate mode button	Mode button on dis-play front.
	X	X	-	-	X	-	Activate MB synchronisa-tion	Mains breaker.
	X	X	-	-	X	-	Activate GB synchronisa-tion	Generator breaker.
	X	X	-	-	X	-	Deactivate MB synchronisa-tion	Mains breaker.
	X	X	-	-	X	-	Deactivate GB synchronisa-tion	Generator breaker.
	X	X	-	-	X	-	Inh. analogue load share	Deactivate analogue load sharing.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	X	X	X	Inh. acknowl-edge in AUTO	If in AUTO mode, the alarm acknowledge is not possible.
	X	X	X	X	X	X	Inh. Modbus commands	Modbus commands are ignored.
	X	X	-	-	X	X	Force DG in quarantine	Diesel generator will not participate in pow-er management.
	X	X	-	-	X	-	Activate short time parallel	1 s max. parallel time ON/OFF.
	X	X	-	-	X	-	Deactivate short time par-allel	
	X	X	X	X	X	X	Inhibit 1	Alarm inhibits.
	X	X	X	X	X	X	Inhibit 2	
	-	X	X	X	X	X	Inhibit 3	
	X	X	-	-	X	-	Select multi-start set 1	Selection of number of generators to start on blackout.
	X	X	-	-	X	-	Select multi-start set 2	
	X	X	-	-	X	X	Block priority swapping	Present start priority list is maintained.
	X	X	X	X	X	-	Activate mode shift	Shift from a running mode to AMF in case of mains failure.
	X	X	X	X	X	-	Deactivate mode shift	
	X	X	X	-	X	X	Inh. BTB close request	Bus tie breaker closing not allowed.
	-	-	X	-	-	X	Block request for section	Use of section not al-lowed.
	X	X	X	-	-	X	Inh. AOP1 buttons	All command buttons on AOP are ignored.
	X	X	X	-	-	X	Inh. AOP2_1 buttons	
	X	X	X	-	-	X	Inh. AOP2_2 buttons	
	X	X	X	-	-	X	Inh. AOP2_3 buttons	
	X	X	X	-	-	X	Inh. AOP2_4 buttons	

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	-	-	X	Inh. AOP2_5 buttons	
	X	X	-	-	X	-	Activate CBE	Activates and deactivates the Close Before Excitation function.
	X	X	-	-	X	-	Deactivate CBE	
	-	X	-	-	-	-	Inh. regulation	-
	-	X	X	X	-	-	Inh. start button	-
	-	X	X	X	-	-	Inh. stop button	-
	-	X	X	X	-	-	Inh. GB button	-
	-	X	X	X	-	-	Inh. MB button	-
	-	-	X	-	-	-	Inh. engine start	-
GOV/AVR control	X	X	-	-	X	X	GOV incr. for 5 s	Speed governor control output.
	X	X	-	-	X	X	GOV decr. for 5 s	
	X	X	-	-	X	X	AVR incr. for 5 s	AVR voltage control output.
	X	X	-	-	X	X	AVR decr. for 5 s	
	-	-	-	-	X	-	Gov increase pulse	Increase or decrease the Governor with the pulse lenght in parameter 2783
	-	-	-	-	X	-	Gov decrease pulse	
	-	-	-	-	X	-	AVR increase pulse	Increase or decrease the AVR with the pulse lenght in parameter 2784
	-	-	-	-	X	-	AVR decrease pulse	
	-	-	-	-	X	-	Ext. Frequency (Gov): Input 46-48	Choose which multi-input to use for ext. frequency input
	-	-	-	-	X	-	Ext. Power (Gov): Input 46-48	Choose which multi-input to use for ext. power input
	-	-	-	-	X	-	Ext. Voltage (AVR): Input 46-48	Choose which multi-input to use for ext. voltage input

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	-	-	X	-	Ext. cos Phi (AVR): Input 46-48	Choose which multi-input to use for ext. cos Phi input
	-	-	-	-	X	-	Ext. Var (AVR): Input 46-48	Choose which multi-input to use for ext. Var input
	-	X	-	-	X	-	Act. Frequency droop regulation:	Activates frequency droop regulation
	-	X	-	-	X	-	Act. Voltage droop regulation	Activates voltage droop regulation
	-	X	-	-	X	-	Reset Analogue output (Gov & AVR)	Resets the analogue governor or AVR output if it has been manually changed
CAN commands	X	X	X	-	X	X	CAN command 01-16 active	The CAN commands can be used to distribute signals between the AGC units in a power management system.
Alarm ind. LEDs	-	-	X	X	X	-	LED X Red +blink	X = ID number (01-04).
	-	-	X	X	X	-	LED X Red	
	-	-	X	X	X	-	LED X Yellow +blink	
	-	-	X	X	X	-	LED X Yellow	
	-	-	X	X	X	-	LED X Green +blink	
	-	-	X	X	X	-	LED X Green	
Display	X	X	-	-	-	-	Set display 1 to primary	When multiple DU-2 displays are used, the command will set the desired display as the primary.
	X	X	-	-	-	-	Set display 2 to primary	
	X	X	-	-	-	-	Set display 3 to primary	
	-	X	X	X	X	-	Activate view 1-20 on display 1	Activate a specific view on display 1.
	-	X	-	-	-	-	Activate view 1-20 on display 2	Activate a specific view on display 2.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	-	-	Activate view 1-20 on display 3	Activate a specific view on display 3.
	-	X	-	-	X	-	Act. power reference menu on display 1	Makes the menu 7050 "Fixed Power set" appear on display 1 (display with CAN ID 1).
	-	X	-	-	X	-	Act. test power reference menu on display 1	Makes the menu 7040 "Test" appear on display 1 (display with CAN ID 1).
	-	X	-	-	X	-	Act. cosphi reference menu on display 1	Makes the menu 7050 "Fixed Power set" appear on display 1 (display with CAN ID 1).
	-	X	-	-	-	-	Act. power reference menu on display 2	Makes the menu 7050 "Fixed Power set" appear on display 2 (display with CAN ID 2).
	-	X	-	-	-	-	Act. test power reference menu on display 2	Makes the menu 7040 "Test" appear on display 2 (display with CAN ID 2).
	-	X	-	-	-	-	Act. cosphi reference menu on display 2	Makes the menu 7050 "Fixed Power set" appear on display 2 (display with CAN ID 2).
	-	X	-	-	-	-	Act. power reference menu on display 3	Makes the menu 7050 "Fixed Power set" appear on display 3 (display with CAN ID 3).
	-	X	-	-	-	-	Act. test power reference menu on display 3	Makes the menu 7040 "Test" appear on display 3 (display with CAN ID 3).
	-	X	-	-	-	-	Act. cosphi reference menu on display 3	Makes the menu 7050 "Fixed Power set" appear on display 3 (display with CAN ID 3).
Quick setup	X	X	X	-	X	-	Off	Quick setup for application configuration.
	X	X	X	-	X	-	Setup stand alone	
	X	X	-	-	X	-	Setup plant	

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
Static sync. type	X	X	-	-	X	-	GB: breaker	Static sync breaker type.
	X	X	-	-	X	-	GB: infinite	
	X	X	-	-	X	-	MB: breaker	
	X	X	-	-	X	-	MB: infinite	
EIC commands	X	X	X	X	X	-	EIC droop	Activate ECU droop.
	X	X	X	X	X	-	EIC droop emulation	Activate droop in the ML-2 (reference setpoint still nominal frequency/power but regulation loop is with added droop for stability).
	X	X	X	X	X	-	EIC reset trip fuel	Reset fuel counter in the ECU.
	X	X	X	X	X	-	EIC enable cylinder cutout	Allows cylinder cutout.
	X	X	X	X	X	-	EIC engine overspeed test	Initiate overspeed test.
	X	X	X	X	X	-	EIC intermittent oil priming	Activate oil priming pump.
	X	X	X	X	X	-	EIC Engine opr mode command	Set the operating mode of the engine.
	X	X	X	X	X	-	EIC Engine speed gov param command	Select default or variant 1 governor parameter setting.
	X	X	X	X	X	-	EIC DPF regeneration inhibit	The Regeneration Disabled (Inhibit) switch disallows any automatic or manual (non-mission) regeneration of the diesel particulate filter. This may be used by the operator to prevent regeneration when the machine is operating in a hazardous environment and the OEM is concerned about high temperature.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	X	X	X	X	X	-	EIC DPF re-generation force	The Regeneration Initiate switch initiates a manual (non-mission) regeneration of the particulate filter when the machine is in non-mission condition and DPF soot levels are high enough to allow regeneration. This switch is for use in forcing a regeneration event to occur to troubleshoot the system. During a non-mission regeneration the engine speed will increase to an optimum speed for regeneration.
	X	X	X	X	X	-	Inh EIC alarms	Inhibit of EIC alarms; red/yellow/protection/malfunction.
	X	X	X	X	X	-	EIC Select Cummins PCC1301	Enable speed control for PCC 1301.
	X	X	X	X	X	-	EIC Start/stop enable	Switch ON/OFF the start and stop commands.
	X	X	X	X	X	-	EIC Speed control inhibit	Disable the EIC speed control.
	-	X	-	-	-	-	EIC Warning auto-ack	Auto acknowledge EIC alarms.
	-	X	-	-	X	-	EIC Interval priming	(H13) Engine will enable lube oil priming with an interval.
	-	X	-	-	X	-	EIC Priming on engine start	(H13) Engine will enable lube oil priming at every start.
	-	X	(X)	(X)	X	-	EIC Speed increase	(H13) A manual "speed up" function (typically used with a DI). (X) applies to MDEC.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	(X)	(X)	X	-	EIC Speed decrease	(H13) A manual "speed down" function (typically used with a DI). (X) applies to MDEC.
	-	X	(X)	(X)	X	-	EIC binary speed In-De enable	(H13) Enables the use of "EIC Speed increase" and "EIC Speed decrease". (Disables the AGC PID regulators). (X) applies to MDEC.
	-	X	-	-	X	-	EIC MTU Alternate Droop Setting	
	-	X	-	-	X	-	EIC MTU inhibit AL speed demand	
	-	X	-	-	X	-	EIC MTU inhibit shutdown override	
	-	X	-	-	X	-	EIC JDEC Stationary re-generation setting	
PID regulator	-	-	X	-	-	-	PID1 increase pulse	The PID1 regulator increases its reference point. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID1 decrease pulse	The PID1 regulator decreases its reference point. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID1 auto regulation	Puts PID1 into auto regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	-	-	PID1 manual regulation	Puts PID1 into manual regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.
	-	-	X	-	-	-	PID1 off regulation	Puts PID1 into off regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.
	-	-	X	-	-	-	PID1 Idle Run Speed Control	This M-Logic command only works when Idle Run is active. The regulator will let the engine run at the same level as specified for running detection (parameter 6173) + 20 %. However, if the number of teeth on the flywheel in parameter 6171 is set to 0, the AGC will attempt to get the engine speed from the ECU over CAN bus H5 line. If none of the above-mentioned requirements are met, the reference value will be the value calculated from the running detection level + 20 %.
	-	-	X	-	-	-	PID1 Temporary Inverse	Inverses the regulator inputs for PID1. If the hardware has been wired in reverse, this command can be very useful.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	-	-	PID1 Reg out set to Min	Resets the regulator to its initial state. The output of the regulator is set to the minimum value defined in parameter 2802. This command also puts the regulator into off regulation mode.
	-	-	X	-	-	-	PID1 Reg out set to Max	Resets the regulator to its initial state. The output of the regulator is set to the maximum value defined in parameter 2803. This command also puts the regulator into off regulation mode.
	-	-	X	-	-	-	PID1 Reg out set to Offset	Resets the regulator to its initial state. The output of the regulator is set to the input offset value defined in parameter 2805. This command also puts the regulator into off regulation mode.
	-	-	X	-	-	-	PID2 increase pulse	The PID2 regulator increases its reference point. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID2 decrease pulse	The PID2 regulator decreases its reference point. Only relevant when the regulator is in manual regulation mode.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	-	-	PID2 auto regulation	Puts PID2 into auto regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.
	-	-	X	-	-	-	PID2 manual regulation	Puts PID2 into manual regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.
	-	-	X	-	-	-	PID2 off regulation	Puts PID2 into off regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.
	-	-	X	-	-	-	PID2 Temporary Inverse	Inverses the regulator inputs for PID2. If the hardware has been wired in reverse, this command can be very useful.
	-	-	X	-	-	-	PID2 Reg out set to Min	Resets the regulator to its initial state. The output of the regulator is set to the minimum value defined in parameter 2842. This command also puts the regulator into off regulation mode.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	-	-	PID2 Reg out set to Max	Resets the regulator to its initial state. The output of the regulator is set to the maximum value defined in parameter 2843. This command also puts the regulator into off regulation mode.
	-	-	X	-	-	-	PID2 Reg out set to Offset	Resets the regulator to its initial state. The output of the regulator is set to the input off-set value defined in parameter 2845. This command also puts the regulator into off regulation mode.
	-	-	X	-	-	-	PID3 increase pulse	The PID3 regulator increases its reference point. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID3 decrease pulse	The PID3 regulator decreases its reference point. Only relevant when the regulator is in manual regulation mode.
	-	-	X	-	-	-	PID3 auto regulation	Puts PID3 into auto regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.
	-	-	X	-	-	-	PID3 manual regulation	Puts PID3 into manual regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	-	X	-	-	-	PID3 off regulation	Puts the PID3 into off regulation mode. This M-Logic command works as a pulse, so the command signal must be deactivated before the command can be issued again.
	-	-	X	-	-	-	PID3 Temporary Inverse	Inverses the regulator inputs for PID3. If the hardware has been wired in reverse, this command can be very useful.
	-	-	X	-	-	-	PID3 Reg out set to Min	Resets the regulator to its initial state. The output of the regulator is set to the minimum value defined in parameter 2882. This command also puts the regulator into off regulation mode.
	-	-	X	-	-	-	PID3 Reg out set to Max	Resets the regulator to its initial state. The output of the regulator is set to the maximum value defined in parameter 2883. This command also puts the regulator into off regulation mode.
	-	-	X	-	-	-	PID3 Reg out set to Offset	Resets the regulator to its initial state. The output of the regulator is set to the input offset value defined in parameter 2885. This command also puts the regulator into off regulation mode.
CIO outputs	-	X	-	-	X	-	CIO 208 no. 1 Out. 9 to CIO 208 no. 3 Out. 27	Activates the relay if the "Relay function" is set to "Limit relay". Only visible if the CIO modules are enabled.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	CIO 116 no. 1 conf. status output to CIO 308 no. 3 conf. status output	Activates the relay if the relay function is set to "Limit relay" and the relay type is "Configurable". Only visible if the CIO modules are enabled.
Mains ATS commands	-	X	-	-	X	-	Activate mains ATS functionality	Enables the ATS function. The function is only accessible in mains units.
	-	X	-	-	X	-	ATS config.: Prioritise mains source	The function is only accessible in mains units.
	-	X	-	-	X	-	ATS config.: Prioritise busbar source	The function is only accessible in mains units.
	-	X	-	-	X	-	ATS config.: Shift at blackout	The function is only accessible in mains units.
Flip-flops	-	X	-	-	X	-	Flip-flop set 1-16	The output is used to set the flip-flop state.
	-	X	-	-	X	-	Flip-flop reset 1-16	The output is used to reset the flip-flop state.
	-	X	-	-	X	-	Flip-flop toggle 1-16	The output is used to toggle the flip-flop state.
Easy connect	-	X	-	-	X	-	Add DG	Adds DG to the power management system.
	-	X	-	-	X	-	Remove DG	Removes DG from the power management system.
	-	X	-	-	X	-	Select yes on the display	Selects yes on the display in easy connect mode.
	-	X	-	-	X	-	Select no on the display	Selects no on the display in easy connect mode.
General purpose PID commands	-	X	-	-	X	-	PIDx activate (1-4)	Activates the PIDs.
	-	X	-	-	X	-	PIDx force min. outp. (1-4)	Forces the PID output to minimum.

Output	AGC-3	AGC-4	AGC 100	CGC 400	AGC 200	PPM-3	Description	Notes
	-	X	-	-	X	-	PIDx force max. outp. (1-4)	Forces the PID output to maximum.
	-	X	-	-	X	-	PIDx reset (1-4)	Resets the PID outputs.

5.3 GPC-3/GPU-3 Hydro/PPU-3/GPU-3

5.3.1 Events, GPC-3/GPU-3 Hydro/PPU-3/GPU-3

Event	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
Alarms	X	X	X	X	All alarms are available as events in the alarm category. Note that the list will show all alarms, also those that are not available in the present configuration of basic unit and options.	-
Limits	X	X	X	X	Like the alarm list it represents the alarms, only here the signal comes instantly, it does not wait for the timer to run out.	-
Events	X	X	X	X	GB opened	Generator breaker.
	X	X	X	X	GB closed	
	X	X	X	X	GB synchronising	Generator breaker synchronising in progress.
			X	X	Waiting on spring loading	Delay event.
	X	X	X	X	G volt/freq OK delay expired	Diesel generator V/Hz OK.
	X	X	X	X	GB direct in	Generator breaker is being closed on dead busbar.
	X	X	X	X	GB black close request	Generator breaker direct close on request to dead busbar.
	X	-	X	X	Running	Engine is running.
	X	X	X	X	Access lock	Binary input access lock activated.
	X	-	X	X	Emergency stop	Emergency stop activated.
	X	X	X	X	DG ready	All is normal, no alarms (Ready LED).
	X	-	X	X	Cranking	Crank output activated.
	X	-	X	X	DG start activated	Start sequence activated.
	X	-	X	X	DG stop activated	Stop sequence activated.
	X	X	X	X	Lamp test	Lamp test in progress.
	X	-	X	X	Battery test activated	Battery test in progress.

Event	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
	X	-	X	X	Eng. heater manual ctrl.	-
	X	-	X	X	Cool down active	Cool down sequence active.
	X	X	X	X	Parameter set 1 used	The parameter sets can be selected internally or with binary input.
	X	X	X	X	Parameter set 2 used	
	X	X	X	X	Parameter set 3 used	
	X	X	X	X	Parameter set 4 used	
	X	X	X	X	BB settings 1 used	Nominal busbar settings 1 or 2 used (BB settings 1 used by default).
	X	X	X	X	BB settings 2 used	
	X	X	X	X	BB voltage OK	Busbar voltage ok.
	X	X	X	X	G volt/freq OK	Generator voltage and frequency ok.
	X	X	X	X	Ack. all alarms active	-
	X	X	X	X	GOV up 5 s activated	Speed governor.
	X	X	X	X	GOV down 5 s activated	
	X	X	X	X	AVR up 5 s activated	AVR (voltage) control.
	X	X	X	X	AVR down 5 s activated	
	X	X	X	X	Alarm inhibit 1 active	-
	X	X	X	X	Alarm inhibit 2 active	
	X	X	X	X	Alarm inhibit 3 active	
	X	-	X	-	Ramp up active	The unit is ramping to a specific power setpoint.
	X	-	X	-	Ramp down active	
	X	-	X	-	Deload active	The unit is de-loading and subsequently opening the breaker.
	X	-	X	-	Freeze ramp active	-
	X	X	X	X	Shutdown override	-
	X	X	X	X	Dynamic sync selected	-
	X	X	X	X	Static sync selected	-
	X	-	X	-	Forced analogue LS	-
	X	X	X	X	Mains sync. inhibit activated	Mains breaker sync. inhibit function is activated (this does not necessarily inhibit the synchronisation of the mains breaker).
	X	X	X	X	Mains sync. inhibited	Mains breaker sync. is in fact inhibited.

Event	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
	X	-	-	-	Power limit 1	Erzmann relay limit 1 reached (ch. 10420).
	X	-	-	-	Power limit 2	Erzmann relay limit 2 reached (ch. 10421).
	X	-	-	-	Power limit 3	Erzmann relay limit 3 reached (ch. 10422).
	X	-	-	-	Power limit 4	Erzmann relay limit 4 reached (ch. 10423).
	X	-	-	-	Inductive reference selected	Inductive AVR regulation set point (ch. 7053).
	X	-	-	-	Capacitive reference selected	Capacitive AVR regulation set point (ch. 7053).
	X	-	X	-	Power droop active	Frequency-dependent power droop is active.
	X	-	X	-	Q droop active	Voltage-dependent Q droop is active.
	X	-	X	-	Cosphi droop active	Voltage-dependent cosphi droop is active.
CAN inputs	X	-	X	-	CAN inputs 01-16 active	The CAN inputs are handled as digital inputs, but are CAN telegrams on the CANshare line.
Static sync. type	X	X	X	X	Breaker sync.	Active status sync. type (breaker sync. is used by default).
	X	X	X	X	Sync. check	
	X	X	X	X	Infinite sync.	
Logic	X	X	X	X	TRUE	"Always".
	X	X	X	X	FALSE	"Never".
Inputs	X	X	X	X	Digital input activated	The number of binary inputs selectable is hardware option-dependent. The number indicates the terminal number for the input in question.
Modes	X	X	X	X	SWBD	Operation mode active.
	X	X	X	X	Manual	
	X	X	X	X	Local	
	X	X	X	X	Remote	
	X	X	X	X	Fixed frequency	Regulation mode active.
	X	-	X	-	Fixed P	
	X	-	X	-	P load sharing	
	X	-	X	-	Frequency droop	
	X	X	X	X	Ext. GOV setpoint	

Event	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
	X	X	X	X	Fixed voltage	
	X	-	X	-	Fixed Q	
	X	-	X	-	Fixed PF	
	X	-	X	-	Q load sharing	
	X	-	X	-	Voltage droop	
	X	X	X	X	Ext. AVR setpoint	
Relays	X	X	X	X	Relay output activated	The number of relays available is option-dependent. The number relates to the lowest terminal number of the output.
Virtual events	X	X	X	X	Virtual event 1-42	These are used as interconnection between multiple logics to enhance the possible number of events in one sequence.
Fail class	X	X	X	X	Block	Start blocking.
	X	X	X	X	Warning	Display warning.
	X	X	X	X	Trip GB	Trip GB.
	X	X	X	X	Trip GB + stop	Trip GB, cool down and stop.
	X	X	X	X	Shutdown	Trip GB and stop.
	X	-	X	-	Safety stop	Deload, trip GB, cool down and stop, DG blocked for start.
CANshare	X	-	X	-	CANshare section 1	-
	X	-	X	-	CANshare section 2	-
	X	-	X	-	CANshare section 3	-
	X	-	X	-	CANshare section 4	-
	X	-	X	-	CANshare section 5	-
	X	-	X	-	BTB A ON	-
	X	-	X	-	BTB A OFF	-
	X	-	X	-	BTB B ON	-
	X	-	X	-	BTB B OFF	-
	X	-	X	-	BTB C ON	-
	X	-	X	-	BTB C OFF	-
	X	-	X	-	BTB D ON	-
	X	-	X	-	BTB D OFF	-
AOP LED 01...08	X	X	X	X	Red flashing	Status of AOP LEDs. (Only available in M-Logic part for AOP LED setup).
	X	X	X	X	Red	
	X	X	X	X	Yellow flashing	
	X	X	X	X	Yellow	

Event	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
	X	X	X	X	Green flashing	
	X	X	X	X	Green	
EIC event	X	X	X	X	DPF Lamp OFF	Particulate filter is OK.
	X	X	X	X	DPF Lamp ON (solid)	Indicates initial need for regeneration.
	X	X	X	X	DPF Lamp ON (blink)	Regeneration is necessary (after regeneration the lamp turns OFF).
	X	X	X	X	DPF Active Regeneration not activated (status)	Regeneration status.
	X	X	X	X	DPF Active Regeneration activated (status)	Regeneration status.
	X	X	X	X	DPF Active Regeneration needed (status)	Regeneration status.
	X	X	X	X	DPF Regen not needed (status)	Level of needed regeneration.
	X	X	X	X	DPF Regen needed - lowest level (status)	Level of needed regeneration.
	X	X	X	X	DPF Regen needed - moderate level (status)	Level of needed regeneration.
	X	X	X	X	DPF Regen needed - highest level (status)	Level of needed regeneration.
	X	X	X	X	DPF Regen not inhibited (lamp)	Regeneration switch is disabled.
	X	X	X	X	DPF Regen inhibited (lamp)	Regeneration disable switch is active. Automatic and manual regeneration cannot occur.
	X	X	X	X	High Exh Syst Temp OFF (lamp)	Exhaust temp. below.
	X	X	X	X	High Exh Syst Temp ON (lamp)	Exhaust temp. above.

5.3.2 Operators

Operator	Description	Notes
OR	Using OR between 2 events means that the output will activate when one of these activates.	
AND	Using AND between 2 operators means that the output will only activate if both events are activated.	

5.3.3 Outputs, GPC-3/GPU-3 Hydro/PPU-3/GPU-3

Outputs	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
Commands	X	X	X	X	SWBD	Operation mode selection.
	X	X	X	X	Manual	
	X	X	X	X	Local	
	X	X	X	X	Remote	
	X	X	X	X	Fixed frequency	Regulation mode selection.
	X	-	X	-	Fixed P	
	X	-	X	-	P load sharing	
	X	-	X	-	Frequency droop	
	X	X	X	X	Ext. GOV setpoint	
	X	X	X	X	Fixed voltage	
	X	-	X	-	Fixed Q	
	X	-	X	-	Fixed PF	
	X	-	X	-	Q load sharing	
	X	-	X	-	Voltage droop	
	X	X	X	X	Ext. AVR setpoint	
	X	-	X	-	Sync.	Selects the controllers active when GB ON.
	X	-	X	-	Sync. + GOV	
	X	-	X	-	Sync. + AVR	
	X	-	X	-	Sync. + GOV + AVR	
	X	X	X	X	Lamp test	-
	X	X	X	X	Ack. all alarms	-
	X	-	X	X	Battery test	-
	X	-	X	X	Eng. heater manual ctrl.	-
	X	X	X	X	Set clock to 4 am	-
	X	X	X	X	Set parameter 1	Choose a parameter set (nominal settings).
	X	X	X	X	Set parameter 2	
	X	X	X	X	Set parameter 3	
	X	X	X	X	Set parameter 4	
	X	X	X	X	BB settings 1	Selection of busbar nominal settings 1 or 2 (BB settings 1 used by default).
	X	X	X	X	BB settings 2	
	X	X	X	X	Block GB sequence	-

Outputs	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
	X	X	X	X	Remote GB ON	Control inputs.
	X	X	X	X	Remote GB OFF	
	X	-	X	X	Remote start	
	X	-	X	X	Remote stop	
	X	X	X	X	Start sync./control	
	X	X	X	X	Deload	
	X	X	X	X	Inhibit Modbus comm.	Disables Modbus and Profibus commands.
	X	X	X	X	Freeze ramp	Locks the power ramp up function until the command is disabled again.
	X	X	X	X	Start sync./ctrl enable	This command is required to be able to use the "Start sync./ control" command from M-Logic and external communication, e.g. Modbus.
	X	-	X	X	Derate Pnom	-
	X	X	-	-	Select 3-phase system	GC will expect to measure AC voltage on a 3-phase system.
	X	X	-	-	Select split L1L3-phase system	GC will expect to measure AC voltage on a 2-phase system.
	X	X	-	-	Select split L1L2-phase system	GC will expect to measure AC voltage on a 2-phase system.
	X	X	-	-	Select single phase system	GC will expect to measure AC voltage on a 1-phase system.
	X	X	X	X	Act. view 1	These functions are used to force the display to show the measurements in view 1-4 that are available in "V1".
	X	X	X	X	Act. view 2	
	X	X	X	X	Act. view 3	
	X	X	X	X	Act. view 4	
	X	X	X	X	Force dynamic sync.	Selection between static and dynamic sync.
	X	X	X	X	Force static sync	
	X	-	X	-	Force analogue load share	-
	X	X	X	X	Reset Ana GOV/AVR output	Resets the output.
	X	X	X	X	Ack. mains protection alarms	Acknowledges all mains alarms.
	X	X	X	X	Mains sync. inhibit activate	Inhibits the closing of the mains breaker.

Outputs	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
	X	X	X	X	Mains sync. inhibit deactivate	Deactivates the close inhibit functionality on the mains breaker.
	X	X	X	X	Low speed RPM	Makes the RPM measurement adapt to slow-speed engines. Functionality is described in the option M4 manual.
	X	-	-	-	Power limit 1	Activate Erzmann relay limit 1 (ch. 10420).
	X	-	-	-	Power limit 2	Activate Erzmann relay limit 2 (ch. 10421).
	X	-	-	-	Power limit 3	Activate Erzmann relay limit 3 (ch. 10422).
	X	-	-	-	Power limit 4	Activate Erzmann relay limit 4 (ch. 10423).
	X	-	-	-	Inductive reference	Activate inductive AVR regulation set point (ch. 7053).
	X	-	-	-	Capacitive reference	Activate capacitive AVR regulation set point (ch. 7053).
	X	-	-	-	X1Y1 droop curve enable	Enables the power-dependent droop function (ch. 7143).
	X	-	-	-	X1Y1 droop curve disable	Disables the power-dependent droop function (ch. 7143).
	X	-	-	-	X2Y2 droop curve enable	Enables the voltage-dependent droop function (ch. 7183).
	X	-	-	-	X2Y2 droop curve disable	Disables the voltage-dependent droop function (ch. 7183).
	X	-	-	-	X2 droop U	Activates voltage-dependent behaviour for droop curve 2 (ch. 7182).
	X	-	-	-	X2 droop P	Activates power-dependent behaviour for droop curve 2 (ch. 7182).
	X	-	X	-	Activate Ramp Speed 1	Forcing use of ramp speeds 1. (Ramp 1 supersedes ramp 2).
	X	-	X	-	Activate Ramp Speed 2	Selects use of ramp speeds 2.
	X	-	-	X	Select three-phase system UL1L2 and IL1	GC will expect to measure AC voltage on a 3-phase system.

Outputs	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
CAN com-mands	X	-	X	-	CAN commands 01-16 active	The CAN commands can be used to distribute signals between units connected to the CANshare line.
Virtual events	X	X	X	X	Virtual event 1-32	These are used as interconnec-tion between multiple logics to enhance the possible number of events in one sequence.
Relays	X	X	X	X	Selectable no. of relays are option-dependent	The list will show all relays possi-ble, including optional ones. Make sure that a selected relay is actually present.
	X	X	X	X	Horn	Activates any relay set to "Horn".
Inhibits	X	X	X	X	Deactivate Local button	Buttons are ignored.
	X	X	X	X	Deactivate Remote button	
	X	X	X	X	Inh. Modbus/Profi-bus commands	Modbus and Profibus commands are ignored.
	X	X	X	X	Inhibit 1	-
	X	X	X	X	Inhibit 2	-
	X	X	X	X	Inhibit 3	-
	X	X	X	X	Inh. AOP-1 buttons	All command buttons on AOP are ignored.
	X	X	X	X	Inh. AOP-2-1 but-tons	
	X	X	X	X	Inh. AOP-2-2 but-tons	
	X	X	X	X	Inh. AOP-2-3 but-tons	
	X	X	X	X	Inh. AOP-2-4 but-tons	
	X	X	X	X	Inh. AOP-2-5 but-tons	
	X	X	X	X	Inh. alarm ac-knowledge	-
	X	-	X	-	Inh. analogue load share	-
Static sync. type	X	X	X	X	Breaker sync.	Selection of status sync. type. (Breaker sync. is used by de-fault).
	X	X	X	X	Sync. check	
	X	X	X	X	Infinite sync.	

Outputs	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
GOV/AVR control	X	X	X	X	GOV incr. for 5 s	Speed governor control output.
	X	X	X	X	GOV decr. for 5 s	
	X	X	X	X	AVR incr. for 5 s	AVR voltage control output.
	X	X	X	X	AVR decr. for 5 s	
	X	X	X	X	Manual GOV up	Manual speed up/down commands.
	X	X	X	X	Manual GOV down	
	X	X	X	X	Manual AVR up	Manual voltage up/down commands.
	X	X	X	X	Manual AVR down	
EIC commands	X	X	X	X	EIC droop	Activate ECU droop.
	X	X	X	X	EIC droop emulation	Activate droop in the ML-2 (reference setpoint still nominal frequency/power but regulation loop is with added droop for stability).
	X	X	X	X	EIC Reset trip fuel	Reset fuel counter in the ECU.
	X	X	X	X	EIC Enable Cylinder Cutout	Allows cylinder cutout.
	X	X	X	X	EIC Engine overspeed test	Initiate overspeed test.
	X	X	X	X	EIC Intermittent oil priming	Activate oil priming pump.
	X	X	X	X	EIC Engine opr mode command	Set the operating mode of the engine.
	X	X	X	X	EIC Engine speed gov param command	Select default or variant 1 governor parameter setting.
	X	X	X	X	EIC DPF Regeneration Inhibit	The Regeneration Disable (Inhibit) switch disallows any automatic or manual (non-mission) regeneration of the diesel particulate filter. This may be used by the operator to prevent regeneration when the machine is operating in a hazardous environment and the OEM is concerned about high temperature.

Outputs	GPC-3	GPU-3 Hydro	PPU-3	GPU-3	Description	Notes
	X	X	X	X	EIC DPF Regeneration Force	The Regeneration Initiate switch initiates a manual (non-mission) regeneration of the particulate filter when the machine is in non-mission condition and DPF soot levels are high enough to allow regeneration. This switch is for use in forcing a regeneration event to occur to troubleshoot the system. During a non-mission regeneration the engine speed will increase to an optimum speed for regeneration.
	X	X	X	X	Inh. EIC alarms	Inhibit of EIC alarms; red/yellow/protection/malfunction.
	X	X	X	X	EIC Select Cummins PCC 1301	Enable speed control for PCC 1301.
	X	X	X	X	EIC Start/Stop enable	Switch ON/OFF the start and stop commands.
	X	X	X	X	EIC Speed Control Inhibit (TSC1)	Disable the EIC speed control.
Buzzer	X	X	X	X	Activate buzzer on all AOP-2	Activation of the buzzer on all AOP-2 units connected or on specific AOP-2 units. The buzzer will be ON as long as the command is active.
	X	X	X	X	Activate buzzer on AOP-2 ID1	
	X	X	X	X	Activate buzzer on AOP-2 ID2	
	X	X	X	X	Activate buzzer on AOP-2 ID3	
	X	X	X	X	Activate buzzer on AOP-2 ID4	
	X	X	X	X	Activate buzzer on AOP-2 ID5	
CANshare	X	-	X	-	Activate CANshare section 1	-
	X	-	X	-	Activate CANshare section 2	-
	X	-	X	-	Activate CANshare section 3	-
	X	-	X	-	Activate CANshare section 4	-
	X	-	X	-	Activate CANshare section 5	-

5.4 GC-1F

5.4.1 Events, GC-1F

Event	Version 1	Version 2	Description	Notes
Alarms	X	X	All alarms available in the alarm list are available as events. Note that the list will show all alarms, also those that are not available in the present configuration of basic unit and options.	
Events	X	X	Mains failure	Mains failure relates to option B3.
	X	X	Diesel generator V/Hz OK	
	X	X	Engine running	
	X	X	Ready to auto start	
	X	X	Cranking	
	X	X	Service timer 1	
	X	X	Service timer 2	
	X	X	Engine heater active	
	X	X	Fuel pump active	
	X	X	Lamp test	
	X	X	Nominal settings 1	
	X	X	Nominal settings 2	
	X	X	Nominal settings 3 (single phase)	1 phase + Neutral.
	X	X	Nominal settings 4 (split phase)	2 phases + Neutral with 180° phase angle between phases.
	X	X	Parameter group 1	
	X	X	Parameter group 2	
	X	X	Parameter group 3	
	X	X	Simple test function	Simple test relates to option B3.
	X	X	Idle mode	
	X	X	Alarm buzzer on AOP-2-1	AOP-2 (Additional Operator Panel) relates to option X4.
	X	X	Alarm buzzer on AOP-2-2	
	X	X	Access lock	
	X	X	Mute horn button	
	X	X	LTO with AMF active	LTO (Load Take Over) relates to option B3.
	-	X	Auto mode shift active	
	-	X	Mains OK	

Event	Version 1	Version 2	Description	Notes
	-	X	Genset start signal (ATS mode)	
	-	X	Cooldown	
	-	X	Source 1 has 1st priority	Only available when "CB1-CB2" is selected in "ATS device type"
	-	X	Source 2 has 1st priority	Only available when "CB1-CB2" is selected in "ATS device type"
	-	X	Priority 1-V/Hz OK	Only available when "CB1-CB2" is selected in "ATS device type"
	-	X	Source 1 start signal	only available when "CB1-CB2" is selected in "ATS device type"
	-	X	Source 2 start signal	Only available when "CB1-CB2" is selected in "ATS device type"
Logic	X	X	TRUE (= always)	
	X	X	FALSE (= never)	
Inputs	X	X	MB closed	MB (Mains Breaker) relates to option B3.
	X	X	MB open	
	X	X	GB closed	GB = Generator Breaker.
	X	X	GB open	
	X	X	Digital input terminal 10-15	
	X	X	Multifunctional binary input terminal 1-3	
	X	X	Ext. I/O dig. in. 1-16	External I/Os relate to option H8.
	-	X	Multifunctional binary input 1-3 wirebreak	Wirebreak detected on input 1-3.
	-	X	Neutral position	ATS function
Modes	X	X	Manual operation	
	X	X	Test sequence	Test sequence relates to option B3.
	X	X	Auto operation	
	X	X	Island mode	
	X	X	AMF (Automatic Mains Failure) mode	AMF mode relates to option B3.
	X	X	LTO mode	LTO mode relates to option B3.
	-	X	Off operation	
	-	X	ATS mode	ATS mode relates to option B3
Relays	-	X	Relay no. 3	
	X	X	Relays no. 21-24	

Event	Version 1	Version 2	Description	Notes
	X	X	Relay no. 26	
	X	X	Relay no. 45	
	X	X	Relay no. 47	
	X	X	External I/O dig. out. 1-16	External I/O relates to option H8.
Virtual events	X	X	Virtual event 1-10	These are used as interconnection between multiple logics to enhance the possible number of events in one sequence.
Fail class	X	X	Warning	
	X	X	Trip GB	
	X	X	Trip and stop	
	X	X	Shutdown	
	X	X	Trip MB	Requires option B3
	-	X	Shutdown + manual mode	
Command timers	X	X	Command timer 1-8	The command timers will issue a 1 s pulse, enough to trigger an event.
EIC event	-	X	DPF Lamp OFF	Particulate filter is OK.
	-	X	DPF Lamp ON (solid)	Indicates initial need for regeneration.
	-	X	DPF Lamp ON (blink)	Regeneration is necessary (after regeneration the lamp turns OFF).
	-	X	DPF Active Regeneration not activated (status)	Regeneration status.
	-	X	DPF Active Regeneration activated (status)	Regeneration status.
	-	X	DPF Active Regeneration needed (status)	Regeneration status.
	-	X	DPF Regen not needed (status)	Level of needed regeneration.
	-	X	DPF Regen needed - lowest level (status)	Level of needed regeneration.
	-	X	DPF Regen needed - moderate level (status)	Level of needed regeneration.
	-	X	DPF Regen needed - highest level (status)	Level of needed regeneration.
	-	X	DPF Regen not inhibited (lamp)	Regeneration switch is disabled.

Event	Version 1	Version 2	Description	Notes
	-	X	DPF Regen inhibited (lamp)	Regeneration disable switch is active. Automatic and manual regeneration cannot occur.
	-	X	High Ext Syst Temp OFF (lamp)	Exhaust temp. below.
	-	X	High Ext Syst Temp ON (lamp)	Exhaust temp. above.

5.4.2 Operators

Operator	Description	Notes
OR	Using OR between 2 events means that the output will activate when one of these activates.	
AND	Using AND between 2 operators means that the output will only activate if both events are activated.	

5.4.3 Outputs, GC-1F

Event	Version 1	Version 2	Description	Notes
Relays	X	X	Selectable number of relays are option dependent	The list will show all relays possible including optional ones. Make sure that a selected relay is actually present.
Commands	X	X	AUTO operation	
	X	X	MANUAL operation	
	-	X	Off operation	
	X	X	Island mode	
	X	X	AMF mode	AMF mode relates to option B3.
	X	X	LTO mode	
	-	X	ATS mode	
	X	X	Lamp test	
	X	X	Ack. all alarms	
	X	X	Switch to nominal settings 1	
	X	X	Switch to nominal settings 2	
	X	X	Switch to nominal settings 3	
	X	X	Switch to nominal settings 4	
	X	X	Mute horn relay	
	X	X	Start genset	Reacts in MANUAL mode only.
	X	X	Stop genset	Reacts in MANUAL mode only.
	X	X	Open GB	Reacts in MANUAL mode only.
	X	X	Close GB	Reacts in MANUAL mode only.
	X	X	Open MB	Reacts in MANUAL mode only.
	X	X	Close MB	Reacts in MANUAL mode only.
	X	X	Start Island test	Initiate test sequence in island.
	X	X	Start AMF test	Initiate test sequence in AMF.
	-	X	Start genset and close GB	
	-	X	Open GB and stop genset	
	-	X	Bypass delay to generator (ATS mode)	
	-	X	Bypass delay to mains (ATS mode)	

Event	Ver-sion 1	Ver-sion 2	Description	Notes
	-	X	Open CB 1	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Close CB 1	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Open CB 2	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Close CB 2	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Start ATS test	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Set source 1 as first priority	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Set source 2 as first priority	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Bypass delay to source 1	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Bypass delay to source 2	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Deactivate source 1 start signal	Only available when "CB1-CB2" is selected in "ATS device type".
	-	X	Deactivate source 2 start signal	Only available when "CB1-CB2" is selected in "ATS device type".
Virtual events	X	X	Virtual event 1-10	These are used as interconnection between multiple logics to enhance the possible number of events in one sequence.
Alarm LED	X	X	Alarm LED 1	The alarm LEDs are placed to the right of the display on the unit front. Possible choices are: - red + blink - red (steady) - yellow + blink - yellow (steady) - green + blink - green (steady)
	X	X	Alarm LED 2	
	X	X	Alarm LED 3	
	X	X	Alarm LED 4	
Inhibits	X	X	Deactivate mode se-lection	Deactivates the AUT and MAN mode buttons on the GC-1F.
	X	X	Inhibit alarm ack. in auto	Prevents the use of the binary input "alarm ack." when in AUTO running mode.
	X	X	Inhibit ext. comm.	Inhibits alarms related to engine communication (option H5).
	X	X	Inhibit 1	Inhibit 1, 2 and 3 are used for alarm inhibit. Remember to activate inhibit in the alarm in question.
	X	X	Inhibit 2	
	X	X	Inhibit 3	

Event	Version 1	Version 2	Description	Notes
Buzzer	X	X	Activate buzzer on main unit	Main unit is the GC-1F unit.
	X	X	Deactivate buzzer on main unit	
	X	X	Activate buzzer on AOP-2-1	AOP-2 units are external Additional Operator Panels. The setup of these is made in a separate M-Logic-like setting (AOP-2 configuration icon on top of the USW screen).
	X	X	Deactivate buzzer on AOP-2-1	
	X	X	Activate buzzer on AOP-2-2	
	X	X	Deactivate buzzer on AOP-2-2	
	X	X	Ack. alarm buzzer on AOP-2-1	
	X	X	Ack. alarm buzzer on AOP-2-2	
EIC commands	X	X	EIC droop	Activate ECU droop.
	X	X	EIC droop emulation	Activate droop in the ML-2 (reference setpoint still normal frequency/power but regulation loop is with added droop for stability).
	X	X	EIC Reset trip fuel	Reset fuel counter in the ECU.
	-	X	EIC Enable Cylinder Cutout	Allows cylinder cutout.
	-	X	EIC Engine overspeed test	Initiate overspeed test.
	-	X	EIC intermittent oil priming	Activate oil priming pump.
	-	X	EIC Engine opr mode command	Set the operating mode of the engine.
	-	X	EIC Engine speed gov param command	Select default or variant 1 governor parameter settings.
	-	X	EIC DPF Regeneration inhibit	The Regeneration Disable (inhibit) switch disallows any automatic or manual (non-mission) regeneration of the diesel particulate filter. This may be used by the operator to prevent regeneration when the machine is operating in a hazadous environment and the OEM is concerned about high temperature.

Event	Ver- sion 1	Ver- sion 2	Description	Notes
	-	X	EIC DPF Regenera- tion Force	The Regeneration Initiate switch initiates a man- ual (non-mission) regeneration of the particulate filter when the machine is in non-mission condi- tion and DPF soot levels are high enough to al- low regeneration. The switch is for use in forcing a regeneration event to occur to troubleshoot the system. During a non-mission regeneration the machine speed will increase to an optimum speed for regenera- tion.
	-	X	Inh. EIC alarms	Inhibit of EIC alarms; red/yellow/protection/ malfunction.
	-	X	EIC Start/Stop ena- ble	Switch ON/OFF the start and stop commands.
	-	X	EIC Speed Control Inhibit (TSC1)	Disable the EIC speed control.